Infrastructure at IEC

Kinetic Testing

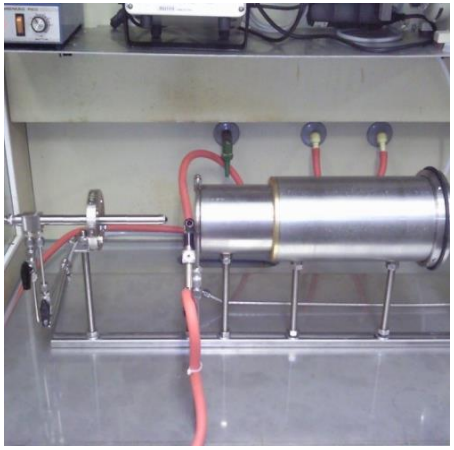
- Test benches
- Loop Reactor
- NH_3-TPD, HTPD
- FTIR Spectrometers
- Mass Spectrometers
- GC/FID/MS
- Infrared Camera
- Soot Generator

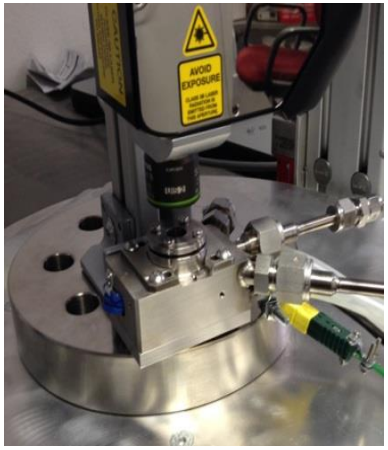
Characterisation

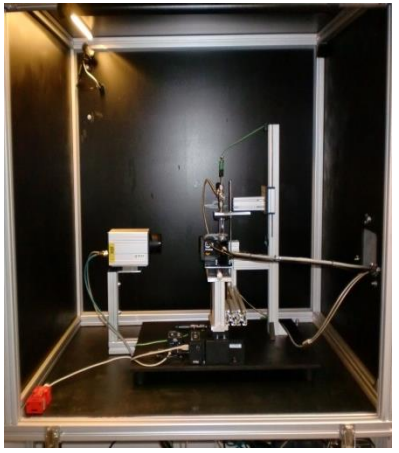
- DRIFTS, FTIR, ATR-IR
- UV-Vis
- Raman with Microscope
- ^{57}Fe Moessbauer
- XPS, XRD, XRF
- SEM
- ICP-OES
- Hg Porosimetry, BET

Preparation

- Flame Spray Pyrolysis
- Hydrothermal Synthesis
- Microwave
- Precipitation
- Complexation
- Ceramic Method

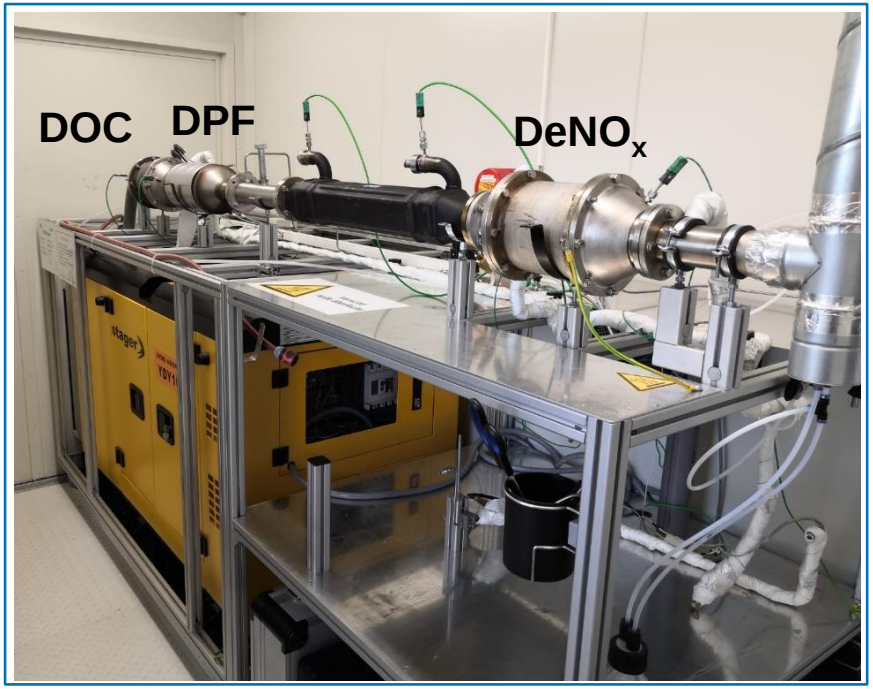






Engine Test Bench

- DI diesel engine (emergency unit)
  - 11 kW at 1500 1/min
  - 3 cylinders, 1532 ccm
  - Compression ratio: 18:1
  - $\lambda = 2…5$
- Exhaust volume flow:
  600…1000 l/min
- Exhaust mass flow:
  40…60 kg/h
- Test of real catalysts:
  DOC, SCR, H_2-deNO$_x$,
  soot oxidation



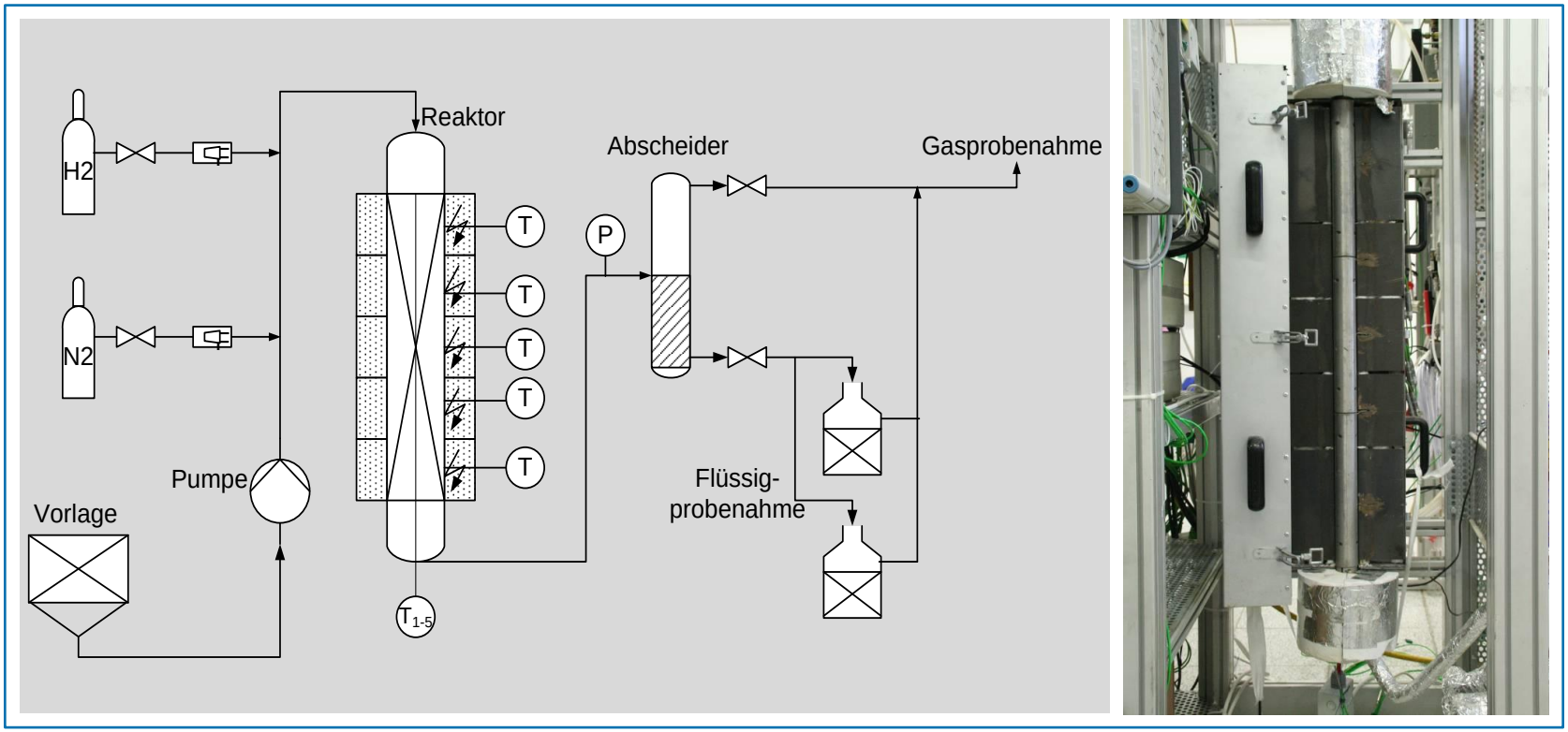
Miniplant for production of gasoline (MtG)

- Raw gasoline < 1 L/d
- Catalyst: m < 60 g (120 ml)
- SiC dilution of catalyst
- Isothermal fixed-bed reactor
- T < 750°C, p < 14 bar
- Periphery:
  - Pre-reactor for DME (γ-Al_2O_3)
  - Product separation at 5 °C and ambient pressure
  - Continuous monitoring of gas flow
  - Oxidation catalyst for off-gas after-treatment

Miniplant for Hydrogenation

Operation Conditions:

- Catalyst Volume: ca. 100 ml
- Pressure: max. 150 bar
- Temperature: max. 400 °C
- LHSV: max. 4 h^{-1}
- Liquid Flow: max. 400 ml/h
- H_2 Flow: max. 300 l/h



Laboratory test bench for NH_3 synthesis

- R&D using Fe catalysts
- Isothermal fixed-baed reactor
- Automatisierter Betrieb (SPS)
- Specification:
  $T < 500°C$, $p < 250$ bar
- Total flow: max. 1000 ml/min
- Analytics:
  Online NDIR spectroscopy for NH_3