

The XRK 900 reactor chamber from Anton Paar is designed for *in situ* powder X-ray diffraction studies of solid-state and solid-state gas reactions at variable pressures, temperatures and gas environments.

## Non-ambient attachment for XRD

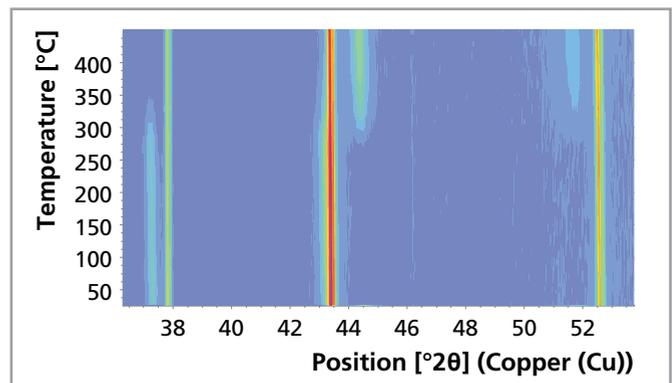
# XRK 900 – reactor chamber

### Application examples

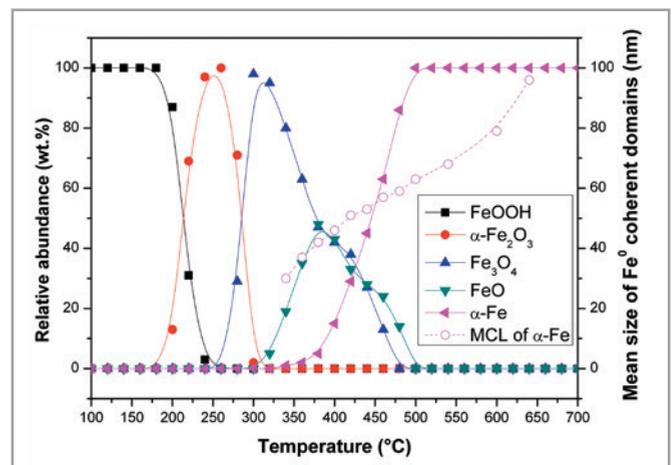
#### Benefits

- Both high temperature (up to 900 °C) and high pressure (up to 10 bar)
- High temperature uniformity over the entire sample volume due to environmental heating
- Accurate temperature measurement with a thermocouple close to the sample
- Rapid and reliable flushing with reactive gas due to the chamber design
- Optional sample spinning to improve particle statistics
- Optional gas flow through the sample
- Optional sample holder unit with electrical feedthrough\* for battery research (from room temperature to 260 °C)

\* Device for charge-discharge is not included



A  $Al_2O_3/NiO$  catalyst was heated to 450 °C in a controlled  $H_2$  flow. NiO was reduced to pure Ni in the temperature interval of 290-340 °C\*



Goethite FeOOH undergoes a series of solid-solid phase transformations in the temperature interval of 100-700 °C under  $H_2$  atmosphere.\*\*

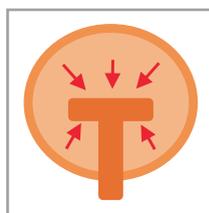
\* XRD data are the courtesy of SABIC STC Riyadh.

\*\*Courtesy of Dr. Jan Filip, Laboratories of Regional Centre of Advanced Technologies and Materials, Palacký University, Olomouc, Czech Republic

# XRK 900 chamber

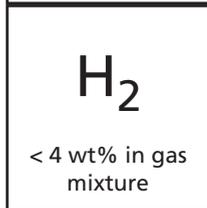
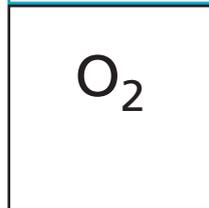
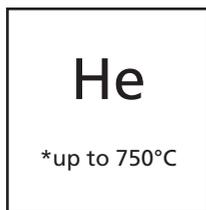
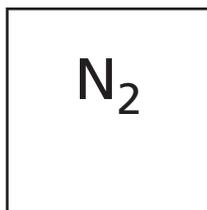
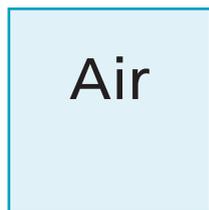


## Features

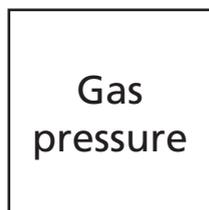


Environmental heater

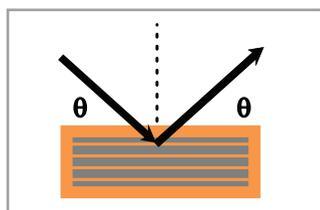
From room temperature to +900°C (air, vacuum)  
 From room temperature to +750°C (in 10 bar He)  
 From room temperature to +260°C (with sample holder with electrical feedthrough)  
 Heat-up time to 900 °C: 30min



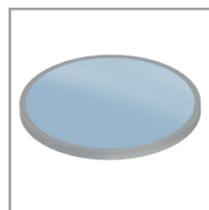
Atmospheres



From 1 mbar to 10 bar

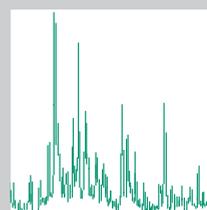


Oscillating flat plate reflection geometry. Sample holders made of ceramic and steel.

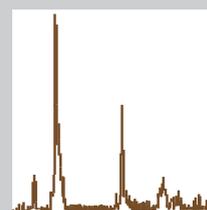


Zero background insert

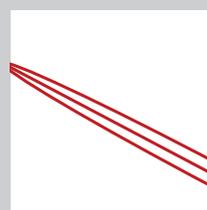
## Applications



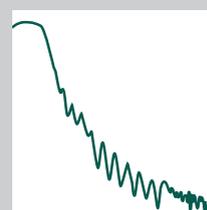
Powder XRD



Basic grazing incidence XRD\*



Basic stress\*



Basic reflectivity\*

\* Limited sample alignment options (no tilt and rotation axis)

## Conclusion

The XRK 900 reactor chamber is an ideal choice for *in situ* studies of temperature-induced phase transformations, changes of structural properties of inorganic and organic powders and solids interacting with various gases.