Nanoparticle Behaviour In Combustion Processes

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Objectives
- Characterization of nanoparticle behaviour in combustion environments
- Implementing a laboratory set up to investigate particle behaviour during combustion
- Selection of a suitable burner type
- Selection of a suitable furnace type
- Adaptation of measurement techniques to high temperature processes
- Aerosol sampling in high temperature conditions

Laboratory set up
- Measurements:
  - Electrical Low Pressure Impactor
  - Scanning Mobility Particle Sizer
  - Transmission Electron Microscopy

Challenges
- Humidity is a key parameter for the formation of a new particle peak at high temperature

Formation of a new particle peak in dependence of temperature

McKenna burner
- 4 g/l CeO₂ in deionized water
- \( \lambda = 1.0 \)
- HaB = 430 mm

Humidity is a key parameter for the formation of a new particle peak at high temperature

Furnace – Dry Air
- 1 g/l CeO₂ in deionized water
- Dry air
- 1200 °C
- 1400 °C
- 1500 °C

Furnace – Humid Air
- 1 g/l CeO₂ in deionized water
- 13 Vol.% water in air
- 1200 °C
- 1400 °C
- 1500 °C

Humid Air

References