

A minimal invasive visualization system for industrial combustion chambers at 310 nm



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The task

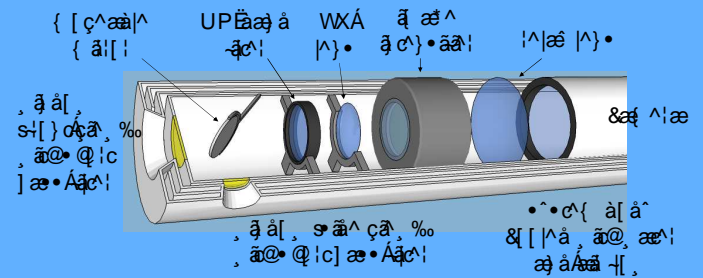
Visualization of industrial combustion processes at high temperatures beyond 1000°C (e.g. in glass production).
Goals: Process optimization, burner development.

The challenge

- Combustion chamber accessible only through small (several cm) inspection ports
- Wall thickness: ~ 1 m
- Optical System inside combustion chamber
- Observation wavelengths: OH-Emissions (~310 nm) and visible
- viewing direction: straight and 90°
- wide angle
- low light level of OH-emission

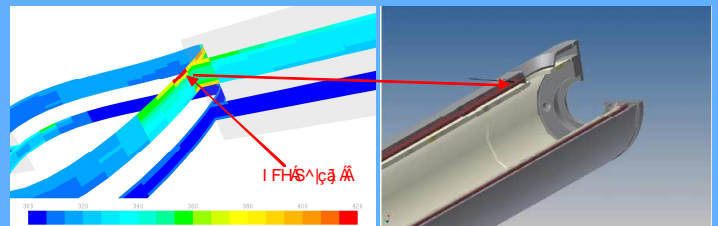
Concept

- Rigid endoscopic system
- Three level cooling system:
 - Shielding of heat radiation
 - Water cooled body
 - Air flow for cooling and particle removal
 - Electronic image transfer
- Built-in image intensifier system
- Moveable mirror to switch viewing direction

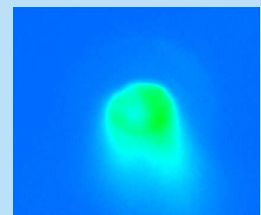
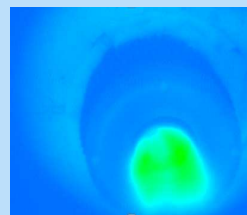


Realization and first results

- OH imaging at video rate out of natural gas burner successfully demonstrated
- First test at 1300°C
- System length: 2 m
- Typical cooling water flow: 27 l / min
- Max. air flow: 40 m³ / h



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