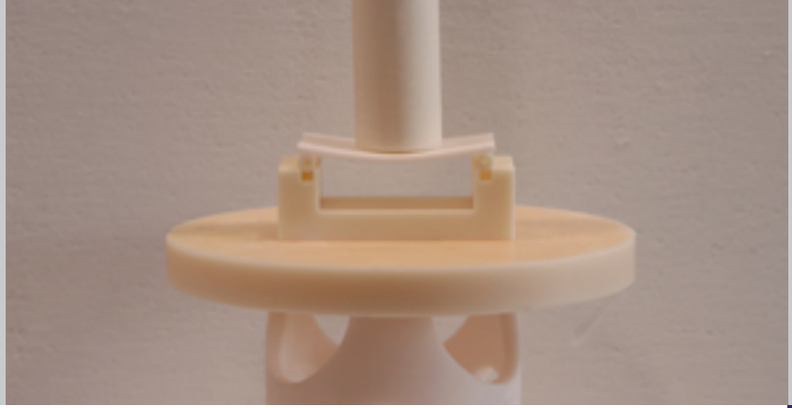

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FRAUNHOFER-CENTER FOR
HIGH TEMPERATURE MATERIALS AND DESIGN HTL

ThermoOptical Measuring System TOM_air

Technical Data

- Maximum temperature: 1750 °C
- Heater: $MoSi_2$ SUPER-Kanthal
- Operates in air
- Measurement resolution: approx. 0.1 µm
- Furnace window: 40 mm x 40 mm
- Fully automatic, software-controlled measuring sequences
- Up to 20 simultaneous customer specific measuring windows
- Weighing unit with maximum weight of 200 g and 0.1 mg resolution
- Uniaxial tensile and compression device for force range up to 4000 N
- 4 acoustic sensors for the detection of cracks

Please feel free to contact us:

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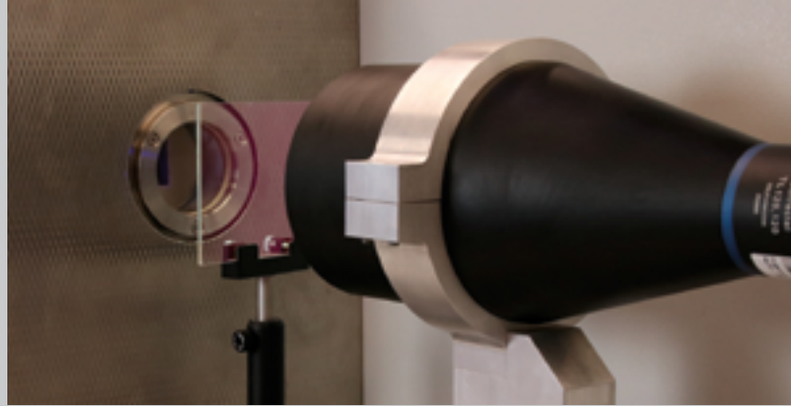
Quality Management
ISO 9001:2015





Usage

TOM_air is a ThermoOptical Measuring system used for material and process analyses in air up to temperatures of 1750 °C. Thanks to an optical beam path, a weighing and force unit and additional microphones, TOM_air enables the examination of various high-temperature phenomena.

The main focus is on material characterization and process development, such as:

- Defect-free debinding of green parts with high binder content (e.g. injection molding, additive manufacturing)
- Shortened debinding cycles for larger components
- Examination of deformation phenomena during sintering processes, e.g. due to porosity gradients, interactions with kiln furniture or differential shrinkage during co-firing
- Optimization of sintering curves regarding energy balance and product quality
- Examination of creep behavior of high temperature materials
- Examination of melting and wetting phenomena

Measuring Principle

TOM_air is equipped with a $MoSi_2$-heated chamber furnace, which allows variable measurement arrangements of samples or small components. Using a horizontal telecentric beam path and a special image analysis software dimensional changes are recorded with high resolution and reproducibility. By means of a weight sensor set above the measuring furnace, gas phase reactions of the sample can be investigated. Additional microphones and runtime filtering to suppress noise allow a sensitive acoustic emission analysis, e.g. to register cracks during debinding.

A tension-compression device allows the investigation of creep phenomena in the vertical axis. In addition, important viscous material characteristics for the simulation of component behavior at high temperatures can be determined.

Moreover, the optical method can be used to investigate wetting and melting phenomena as well as the behavior of soft materials, such as glasses or slags.

Our Services

Fraunhofer-Center HTL carries out contract measurements. In addition, TOM systems are designed and distributed according to customer requirements.

Material Characterization

- Creep behavior and viscous parameters
- Wetting and melting phenomena

Process Analysis and Process Optimization

Debinding
- Weight loss curves
- Cracking and deformation phenomena
- Optimization of debinding cycles

Sintering
- Sintering curves and sintering kinetics
- Deformation phenomena
- Creep behavior
- Optimization of sintering parameters