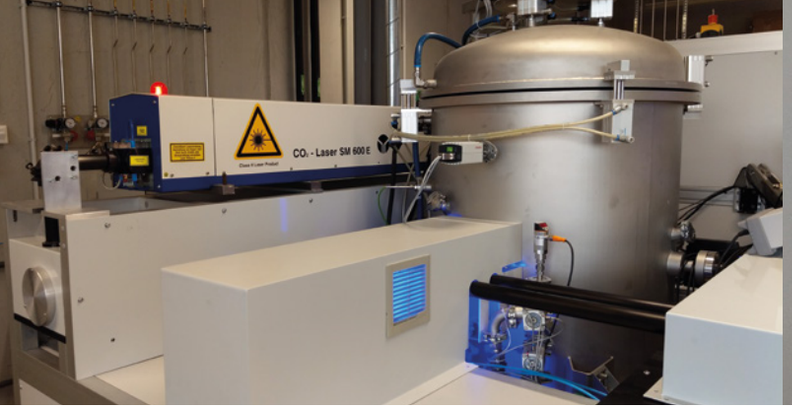

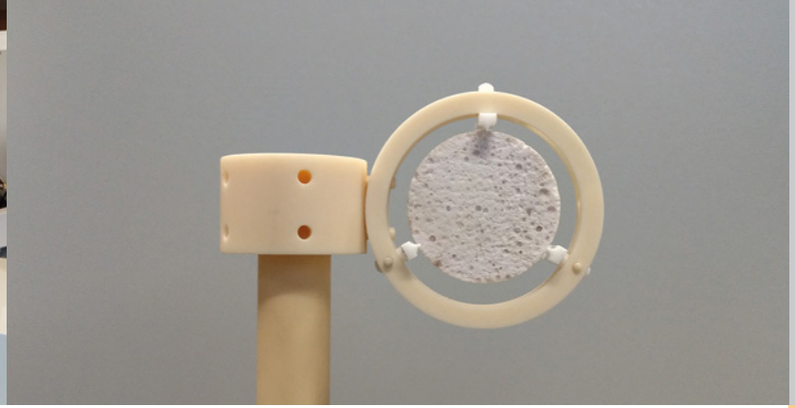

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HIGH TEMPERATURE MATERIALS AND DESIGN HTL

ThermoOptical Measuring System TOM_wave

Technical Data

- $MoSi_2$-heated furnace up to 1750°C furnace temperature
- Measurements in air and inert atmosphere in a muffle furnace
- 600 W CO_2-laser
- One and two-sided sample irradiation
- Variable laser profile with regard to power, diameter and pulse rate
- Software controlled measurement sequences
- Disk-shaped samples with 35 mm diameter and up to 30 mm thickness
- Automatic sample changer for 5 samples
- Large sample volumes for heterogeneous materials
- Various thermo-physical and thermo-mechanical properties

Please feel free to contact us:

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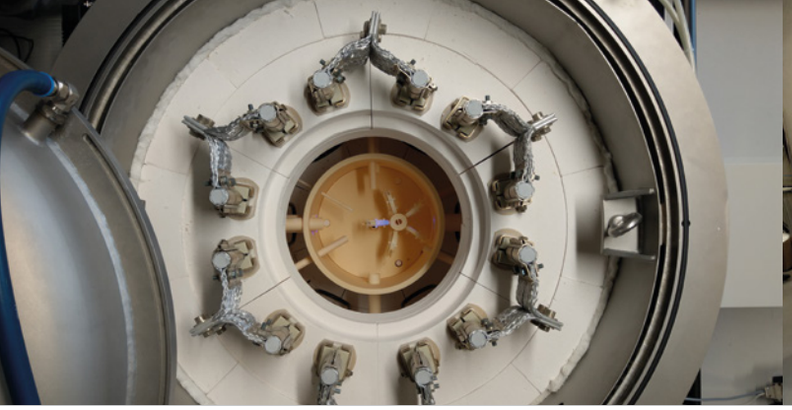
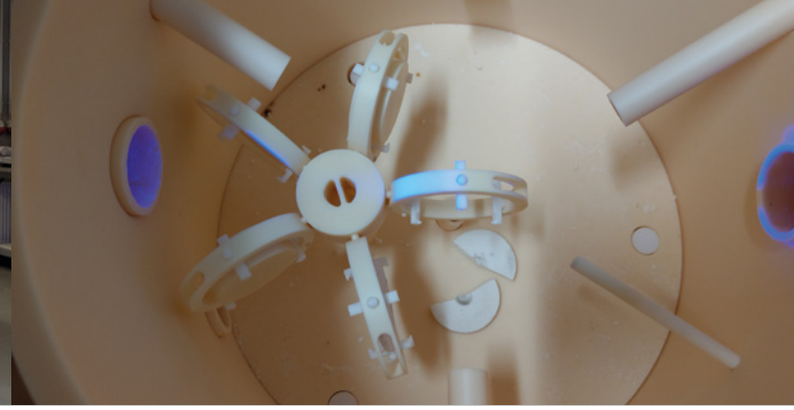
Quality Management
ISO 9001:2015

Fraunhofer-Center HTL
is certified acc. to ISO 9001:2015





Furnace-Laser-Combination

TOM_wave is a ThermoOptical Measuring system for the detection of thermo-mechanical and thermo-physical material properties at high temperatures, with the highest precision and without additional pre-treatment of materials.

TOM_wave is based on the worldwide unique combination of a high-temperature furnace with a CO_2-laser. The furnace serves to reach a base temperature in a controlled atmosphere. The laser is used for short-term heating of samples.

The laser control integrated in the measuring software allows a variable adjustment of the power profile.

TOM_wave uses disk-shaped samples with a volume of approx. 10 to 20 cm^3. The relatively large measurement volume enables representative measurement results, especially for materials with complex microstructures – such as refractory materials and CMCs. By means of an automatic sample changer, 5 samples can be measured in one furnace cycle.

Measuring Principle

Data logging takes place via pyrometers integrated axially and radially in the furnace, via a spectrometer and via microphones for spatially resolved acoustic emission analysis and an optical axis for dilatometry.

Thermal diffusivity is determined unaltered without a coating by means of CO_2-laser-flah-measurement.

The analysis of the sample damage takes place via acoustic emission examination.

The laser control integrated in the measuring software enables a variable adjustment of the power profile with respect to:

- One- or two-sided laser irradiation
- Power: 0 to 600 W
- Diameter: 1 to 18 mm
- Variable laser profile with regard to power, diameter and pulse rate of the laser: 0.1 ms to continuous operation

Our Services

With TOM_wave all common high-temperature materials such as refractory materials, ceramics, composites, metals or glasses can be analyzed and characterized.

The following thermo-mechanical and optical material properties can be measured:

- Thermal shock resistance
- Resistance to thermocycling
- Thermal conductivity / diffusivity
- Dynamic modulus of elasticity
- Coefficient of thermal expansion
- Heat capacity
- Spectral and integral emissivity
- Large sample volumes for representative measurements on materials with complex microstructure
- Temperature range from room temperature to 1800°C in a controlled atmosphere
- Analysis of sample damage through in-situ acoustic emission examination or crack wall friction
- Non-contact measurement of the thermal diffusivity (radial and axial)