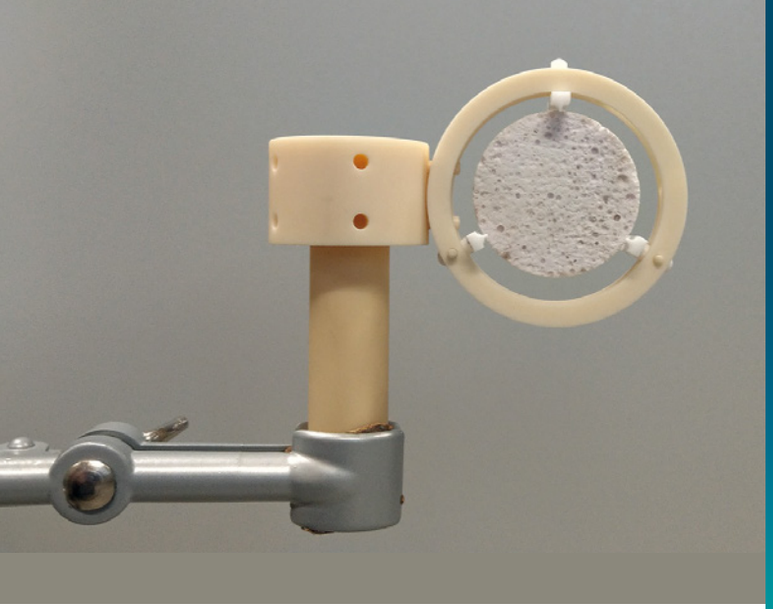

Fraunhofer Center HTL
is certified acc. to ISO 9001:2015

Service Offering

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

The following thermomechanical and optical material properties can be measured:

- Thermal shock resistance
- Thermal cycling behavior
- Temperature / thermal conductivity
- Heat capacity
- Spectral and integral emissivity
- Large sample volumes for representative measurements on materials with complex microstructure
- Temperature range from room temperature to 1750 °C in controlled atmosphere
- Non-contact measurement of thermal diffusivity (radial and axial)

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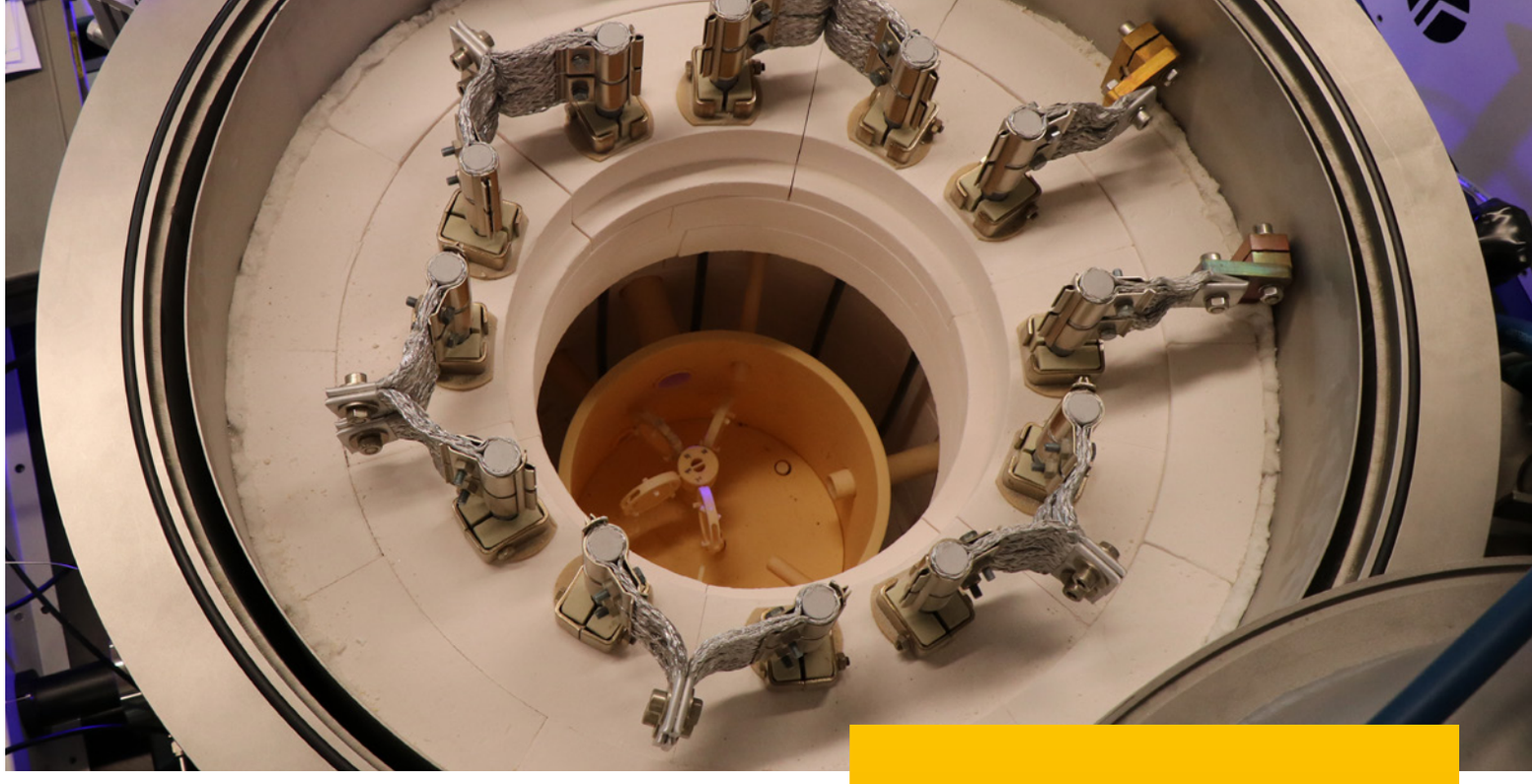
Fraunhofer ISC

Center for High Temperature Materials and Design HTL

ThermoOptical Measuring System TOM_wave



TOM_wave

Furnace-Laser Combination

TOM_wave is a ThermoOptic Measuring system for the acquisition of thermomechanical and thermophysical material properties at high temperatures, with highest precision and without additional material pre-treatment. The system is based on the worldwide unique combination of a high-temperature furnace with a CO_2 laser. The furnace is used to achieve a base temperature in a controlled atmosphere. The laser is used for short-term heating of the samples. The laser control integrated in the measurement software allows variable adjustment of the power profile.

TOM_wave uses disk-shaped samples with a volume of about 10 to 20 cm³. 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

The measured values are recorded via pyrometers integrated axially and radially in the furnace, via a spectrometer and via microphones for spatially resolved acoustic emission analysis, as well as via an optical axis for dilatometry.

The thermal diffusivity is measured using the CO_2 laser flash method without coating.

The laser control integrated in the measurement software allows variable adjustment of the power profile with respect to:

- Power: 0 to 500 W
- Diameter: 3 to 18 mm
- Laser pulse rate: 0.1 ms to continuous operation

Technical Data

- $MoSi_2$-heated furnace up to 1750 °C furnace temperature
- Measurements in air and inert atmosphere in muffle
- 600 W CO_2 laser
- One- and two-sided sample irradiation
- Variable laser profile in terms of power, diameter and pulse rate
- Disc-shaped samples with 35 mm diameter and up to 20 mm thickness
- Automatic sample changer for 5 samples
- Large sample volumes for heterogeneous materials
- Wide range of thermophysical and thermomechanical properties