



## Our services

- Design and synthesis of coatings at laboratory and pilot plant scale
- Lacquer production also under inert conditions
- Sampling with sols, dispersions and solutions of inorganic polymers up to 100 liters
- Coating of samples and components
- Coating of textile structures (e.g. fabric, fibers)
- Development of ceramic coatings
- Layer application also under inert conditions (Ar, N<sub>2</sub>)
- Characterization of lacquers and coatings
- Investigation of rheological properties
- Particle analysis
- Sedimentation analysis
- Characterization of wetting properties and surface tension
- Determination of pot lives

## Application examples

- Corrosion protection, including high temperature applications
- Non-stick coatings for molten metal
- Gas-tight sealing of porous structures
- Heating layers

## Please feel free to contact us:

### Fraunhofer-Center for High Temperature Materials and Design HTL

Gottlieb-Keim-Straße 62  
95448 Bayreuth

[www.htl.fraunhofer.de](http://www.htl.fraunhofer.de)

Jonathan Maier  
Tel.: +49 931 4100-969  
[jonathan.maier@isc.fraunhofer.de](mailto:jonathan.maier@isc.fraunhofer.de)

Joachim Vogt  
Tel.: +49 921 78510-417  
[joachim.vogt@isc.fraunhofer.de](mailto:joachim.vogt@isc.fraunhofer.de)



Fraunhofer-Center HTL  
is certified according to ISO 9001:2015

## Lacquers and Coatings





## Design and synthesis of lacquers

Fraunhofer-Center HTL provides coatings based on sols, dispersions and inorganic polymers according to customer requirements. A large material diversity comprising various non-oxide and oxide systems is offered for sampling. The synthesis of these coatings is carried out on laboratory scale up to 2 liters or up to 100 liters on pilot plant scale. In both cases, the preparation can also be carried out under inert conditions.

In addition to the development and sampling of coatings, Fraunhofer-Center HTL also modifies existing coatings customer-specifically. For this purpose, the properties of the coating precursors are specifically adjusted, in order to be processible in an optimal manner, inter alia using additives.

For the development work, modern laboratory equipment and characterization methods are available at Fraunhofer-Center HTL.

## Coating processes

At Fraunhofer-Center HTL, samples and components are coated according to customer requirements. The application of the coatings is usually performed with liquid precursors based on sols, dispersions or inorganic polymers. In addition, textile structures can be coated. Depending on the specific requirements, the coatings are applicable under air or under inert conditions.

The application of the coatings is typically followed by a thermal treatment – in order to fire and densify the layers. In doing so, it is taken into account that the temperature load does not adversely affect the properties of the base material. The existing coating methods allow film thicknesses from a few nanometers up to more than 100  $\mu\text{m}$ .

In addition to the customized coating of components, Fraunhofer-Center HTL also develops and optimizes individual ceramic coatings for use at high temperatures.

## Application process

- Dip coating
- Coating by spraying or brushing
- Doctor blade coating
- Calendar coating

## Selection of material systems

- $\text{Al}_2\text{O}_3$ ,  $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$
- $\text{ZrO}_2$ ,  $3\text{Y}_2\text{O}_3\text{-ZrO}_2$ ,  $8\text{Y}_2\text{O}_3\text{-ZrO}_2$
- $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{MgO}$ ,  $\text{MgAl}_2\text{O}_4$
- $\text{Y}_2\text{Al}_5\text{O}_{12}$ ,  $\text{YSiO}_5$ ,  $\text{Y}_2\text{Si}_2\text{O}_7$
- $\text{LaPO}_4$
- $\text{SiC}$ ,  $\text{BN}$
- Different glass systems
- Metals and alloys

## Coating characterization

Concerning the characterization of the different coatings, a multitude of analytic methods is provided. These range from the chemical analysis over material-related tests to application-oriented tests. Numerous of these tests can be carried out according to DIN standards. On request, customer-specific test methods can be implemented according to the customers preferences.