



OPTICS

Project reports

- 90 Optical ceramics with specifically adjusted spectral transmission
- 92 Barrier layers for the encapsulation of organic electronics
- 93 Tape and 3D dosimetry for the monitoring of electron beam processes

In the "Optics" business division, Fraunhofer IKTS designs and supplies ceramic materials, components, and systems for lighting, medical and laser technology, optical measurement and diagnostic systems as well as ballistic applications.

Optical technologies are the drivers of innovation and growth. This fact applies to lighting – as in resource-friendly LEDs, for instance – but also to minimally invasive medical diagnostic systems and contact-free measuring devices. With the aid of competitive technologies, Fraunhofer IKTS transfers basic scientific expertise to products that demonstrate high performance capacity and solid reliability. This technology chain begins with the material and ends with integration into complex systems.

For years now, Fraunhofer IKTS has been and remains the global leader in the production of transparent ceramics with special ultrafine crystalline structures and superior mechanical parameters. These polycrystalline ceramics exhibit the kind of superior quality that makes them suitable for use in those optical or photonic applications that require a high degree of optical homogeneity and mechanical stability while simultaneously keeping absorption and scatter loss to a minimum. The targeted dosing or phase synthesis, by contrast, leads to optically active materials, such as luminescent materials for example, i.e. materials for which a high quantum yield, thermal stability of the color spectrum and long persistence periods represent quintessential parameters. If these two technologies are combined, active optoceramics with a homogeneous distribution of dopants in the ceramic or polymer matrix are developed at Fraunhofer IKTS. These components have both active and beam-forming properties as well as good mechanical and thermal properties, and are suited for a diversity of applications in the field of optoelectronics. Of increasing importance for the business division are optical systems – specifically those involving reflection instead of transmission, and are used as high-performance components in laser and aerospace engineering.

Optical methods hold particular appeal and potential for rapid and cost-effective condition monitoring of materials, modules, and industrial and biomedical processes. Optical procedures can demonstrate their benefits wherever measurements must be contact-free or performed in extreme conditions. At Fraunhofer IKTS, new and established methods are being developed and integrated as a comprehensive system into the respective process, based on customer specifications. In addition to processes built on the interaction of light and material, the institute also focuses on optically active nanosensors in the development of optical measurement and diagnostic systems.