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Laser-Induced Deflection - LID

Highly sensitive and absolute light absorption measurement in optical materials, coatings, and fibers

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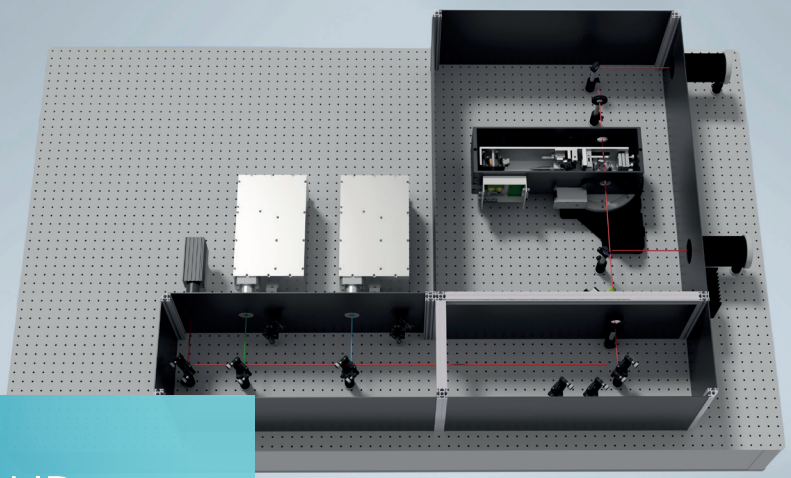

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Cover: LID setup – inside view.

Top: LID setup for 355 nm, 532 nm, and 1064 nm as well as two angles of incidence (0° and 45°).

Motivation

Increasing laser power for material processing or decreasing structures for semiconductor lithography - in a large variety of applications the optical components take advantage of lower and lower light absorption properties. We address your demands for absolute absorption testing in optical materials, thin films and fibers in a wide wavelength range from the deep UV (DUV) to the infrared by means of the LID technique - uniquely combining photo-thermal measurement and electrical calibration. Investigations into the energy balance together with complementary in-house techniques (scattering, transmission) show the reliability of the individual methods.

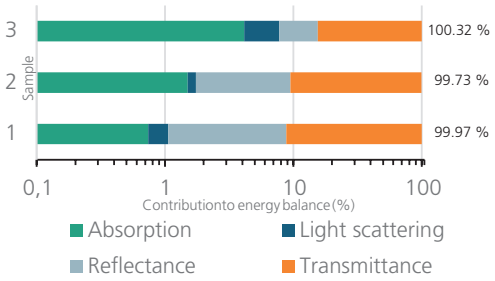
Key Parameters

- Highest sensitivity (sub-ppm level)
- Reliable **absolute** calibration
- Adapted measurement concepts
- No laser / wavelength restrictions (pulsed and cw light sources, DUV-IR spectral range)
- Bulk materials / coatings / fibers
- Customized setups

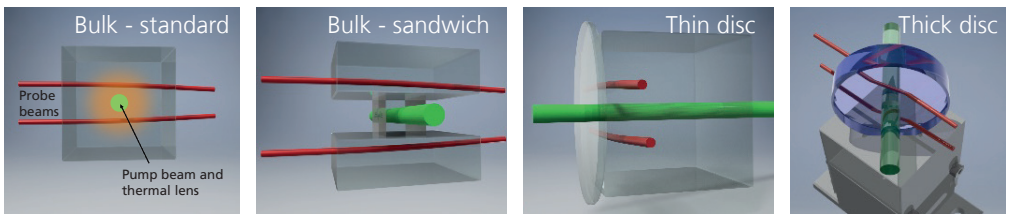
Adapted measurement concepts

Coatings on thin or thick discs, bulk materials with small and large apertures – adapted measurement concepts address barely all demands. Amongst all, the so-called sandwich concept allows separating the positions of the pump beam (inside the test sample) from the probe beam (inside the sandwich tiles). This leads to some outstanding features:

- Strongly simplified bulk absorption calibration using just one material of choice
- Sensitivity boost for materials with low photo-thermal response
- Measuring materials that are not transparent for probe beam wavelength



Energy balance of CaF_2 substrates at a wavelength of 193 nm.



LID working principle and measurement concepts.

Contact

Department
Functional Surfaces and Coatings

Scientific Group
Surface and Thin Film Characterization

Project Leader
Dr. Christian Mühlig
Phone +49 3641 807-346
christian.muehlig@iof.fraunhofer.de

Group Leader
Dr. Marcus Trost
Phone +49 3641 807-242
marcus.Trost@iof.fraunhofer.de

Fraunhofer IOF
Albert-Einstein-Strasse 7
07745 Jena
Germany
www.iof.fraunhofer.de

www.
more info