Engler-Bunte-Institute
Combustion Technology
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Bachelor's Thesis

Spectral fingerprints: Inelastic light scattering from functional solids

Motivation

When light interacts with matter, a small fraction can be scattered with a change in energy. This inelastic light scattering produces characteristic spectral signatures that provide information about the structure and state of a material. In this way, even minute changes in solids can be investigated non-intrusively.

Project description

The aim of this thesis is the experimental characterization of selected solids using laser-based spectroscopy of inelastically scattered light. To this end, a suitable measurement setup will be designed, assembled, and commissioned. The work focuses on identifying characteristic spectral signatures, assessing the potential for quantitatively describing different material states, and investigating the depth sensitivity of the measurement technique. The specific focus can be adjusted depending on individual interests and the scope of the thesis.

Tasks

- Familiarization with the fundamentals of inelastic light scattering and spectroscopy
- Design, assembly, and commissioning of a laser-based spectroscopy system
- Spectroscopic measurements on selected solid samples
- Identification and analysis of characteristic spectral signatures
- Investigation of the depth sensitivity of the measurement technique
- Development and evaluation of quantitative analysis methods
- Assessment of measurement conditions, reproducibility, and uncertainties

Background knowledge

Students in engineering or the natural sciences. Previous experience with optical measurement techniques is helpful but not required. An interest in experimental work and/or data analysis is expected.

Date, location

Starting immediately, Campus South

Contact

If you are interested, feel free to contact us:

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