UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

REAKTIVE FLUIDE

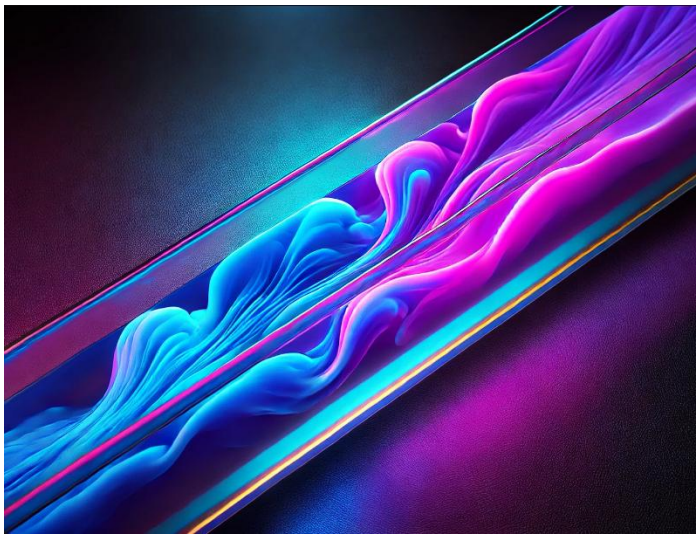
Institut für Energie- und Material-Prozesse

Bachelor or Master thesis

"Absorption and emission spectroscopy for the characterization of fluorescent tracers for mixture quantification"

Background:

Fluorescent tracers are frequently used in fluid mechanics and process analysis to investigate mixing processes in liquids. These tracers enable precise visualization and quantification of the concentration distribution, which is essential for the optimization of mixing processes. The choice of a suitable tracer depends crucially on its optical properties, in particular absorption and emission spectra as well as its stability in different media.



Aim of the work:

The aim of this work is to systematically investigate the optical properties of various fluorescent tracers. The aim is to identify suitable tracers for mixture quantification in flow experiments.

Key points of the work include:

- Spectral characterization: investigation of the absorption and emission spectra of the tracers using UV-Vis and fluorescence spectroscopy.
- Practical application: Evaluation of the tracers for specific mixing experiments, e.g. in model flows.
- Data analysis: Development of a criteria catalog to evaluate the tracers regarding their suitability for mixture quantification.

Tasks:

The work can be carried out as a Bachelor's or Master's thesis, with the scope being adapted accordingly.

The thesis includes experimental and analytical work:

- Familiarization with the methods of absorption and emission spectroscopy.
- Preparation, execution and evaluation of laboratory experiments.
- Documentation of results and preparation of an evaluation guide for the selection of fluorescent tracers.

Requirements:

- Interest in experimental laboratory work and optical measurement techniques
- Independent and structured way of working
- Team and communication skills

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