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| <input type="checkbox"/> Bachelor's thesis | <input checked="" type="checkbox"/> theoretical |
| <input type="checkbox"/> Plant design exercise | <input checked="" type="checkbox"/> experimental |
| <input checked="" type="checkbox"/> Master's thesis | <input type="checkbox"/> constructive |

Simplifying chemical degradation analysis in fuel cells with optical spectroscopy

Field of study: Chemical Engineering, Technical Chemistry, or similar

Membranes for polymer electrolyte membrane fuel cells are known for their thermal and chemical stability. However, under fuel cell operating conditions, chemical membrane degradation can occur, which results in the release of fluoride species. However, there is a lack of measurement techniques that offer adequate detection limits, easy use, and fast measurement times. A solution therefore could transform the analysis of chemical degradation and push fuel cell development forward.

The aim of this thesis is to develop measurement techniques for fluoride in effluent fuel cell water to help quantify degradation.

The student's tasks include:

- **Measuring fluoride in water samples**
- **Sample collection and preparation**
- **Fuel cell testing and operation**
- **Correlation of degradation and operating conditions**

In the Fuel Cell & Hydrogen Working Group at CEET, you can become part of a team of experienced researchers, PhD students with expertise in materials preparation, electrochemistry and cell characterization, as well as other motivated master students. The research group has access to a fully equipped laboratory with the necessary infrastructure for the planned experimental work.

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