



**University of Stuttgart**  
Germany

Institute of Combustion and Power Plant Technology  
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Announcement

Master Thesis

## Conduction and analysis of long-term tests of CO<sub>2</sub> capture in entrained flow mode using Ca(OH)<sub>2</sub>

(After consultation with the supervisor, the scope can be adapted for bachelor thesis or student research project.)

### Background

Over 40% of global CO<sub>2</sub> emissions are caused by power generation in fossil-fired power plants. CCS (Carbon Capture and Storage) technologies can be effectively integrated into existing power plants and can lead to CO<sub>2</sub> emission reductions of up to 90%. However, the growing share of renewable energies requires flexible operation of conventional power plants, which will tend to be used more as backup in the future. As a result, CO<sub>2</sub> capture processes in such power plants must also be able to respond quickly and dynamically to part-load operation. Among the various CCS technologies, calcium looping is a promising process that can effectively accommodate such load changes in power plants.

### Process

The calcium looping process (CaL) is based on the cyclic calcination and carbonation ( $\text{CaCO}_3 \rightleftharpoons \text{CaO} + \text{CO}_2$ ) of a calcium-containing sorbent. In this work, industrial Ca(OH)<sub>2</sub> is used as sorbent, which has favorable CO<sub>2</sub> capture properties. After CO<sub>2</sub> capture, the resulting CaCO<sub>3</sub> has to be regenerated again, which is done by means of an oxy-fuel calcination at high temperatures (850-950°C). Within the scope of this work, modifications and long-term tests will be carried out on the plant in order to be able to identify, how the process works under different conditions.

### Approach and tasks

1. Literature review and familiarization with the topic
2. Preparation/modification of the test facility for the experimental conduction
3. Test conduction, as well as laboratory and data analysis
4. Writing of thesis (**German or english**)

### Requirements

- Interested in CCS-Technologies
- Interested in experimental work on pilot scale and laboratory equipment
- Knowledge in data analysis (Excel, Python) and plant engineering desirable

**Start date: from now on.**

### Interested students please contact

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