



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 CO₂ capture in entrained flow mode using Ca(OH)₂

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

Background

Over 40% of global CO₂ 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 CO₂ 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, CO₂ 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)₂ is used as sorbent, which has favorable CO₂ capture properties. After CO₂ capture, the resulting CaCO₃ 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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