Dust separation on a biomass boiler using a wet scrubber based on the principle of heterogeneous condensation

Background
The generation of energy from biomass is an important element in achieving the ambitious climate protection goals of the federal governments. However, the combustion of biomass leads to emissions of particulate matter and gaseous compounds. The ultrafine particles (UFP) in particular play an essential role due to their negative effects on human health. The UFP can only be insufficiently removed from the flue gas with conventional separators such as electrostatic precipitators (ESP) and wet scrubbers. In this work, the dust emission reduction potential will be investigated and optimized using the principle of heterogeneous condensation. During the heterogeneous condensation, the ultrafine particles are at first activated when the gas phase reaches distinct conditions such as supersaturation. As a second step, there is the particle enlargement due to particle growth which makes the ultrafine particles large enough to be separated in the wet scrubber. There are various operating parameters that influence the process of heterogeneous condensation such as volume flow, L/G ratio, wash water temperature etc. This influences will be investigated in this study.

Requirements:
- Ability and interest in practical and field work
- Working independently
- Interest in working with measurement devices and associated software
- Ability to handle large amount of data
- Basic knowledge regarding air quality control

Objectives:
- Literature review
- Preparation of measurements: Measurement technique
- Experiments on wet scrubber
- Assessment and compilation of the results
- Report and presentation

Start date: Immediately!

Scope of work will be adapted depending on the interests of the student and ECTS gained (also Student Research Project or Bachelor Thesis possible).

Interested students please contact:
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