

# Deposition of particulate matter on the surface of foam bubbles

Particle separation by foam column is possible, even submicron particles could be deposited.  
Possibility of gas scrubbing could contribute an additional benefit.

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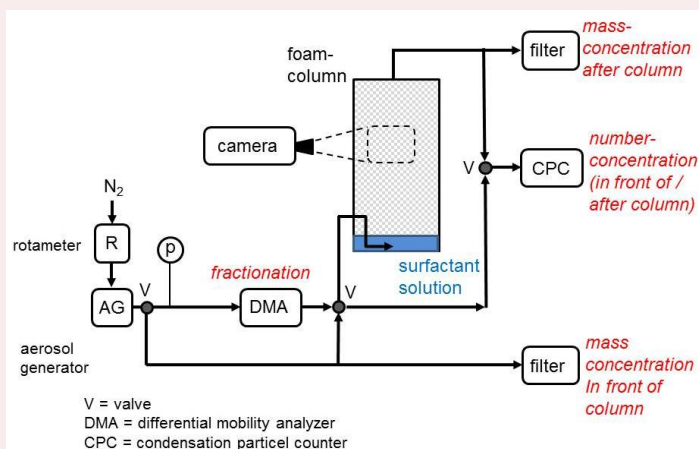
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## Source

At Kutzner + Weber tests with particle deposition on foam bubbles were conducted using the real flue gases from a wood chip furnace. The filtration efficiency on TSP according to VDI 2066 showed an interesting potential of this technique. To determine the main influencing variables basic tests were performed at the TU Clausthal which underlined the promising potential of foam columns for the separation of PM.



## Method



Schematic diagram of the test rig to investigate the characteristics of foam bubbles and particle separation on a lab model of a foam column



foam column model

Foam column for determination of different parameters which have influence on the deposition of particulate matter on foam bubbles

### Investigated parameters:

- different surfactants
- nozzle size
- gas velocity
- residence time
- particle size

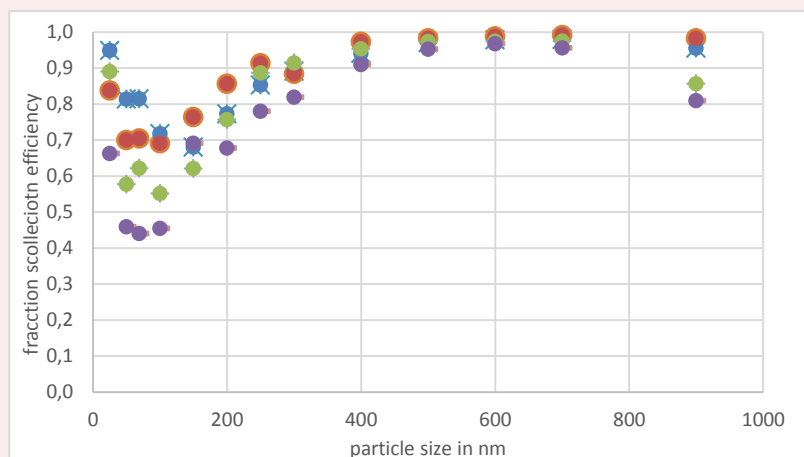
## Results

The tests with the foam column prototype with different kinds of surfactants showed good deposition efficiencies.

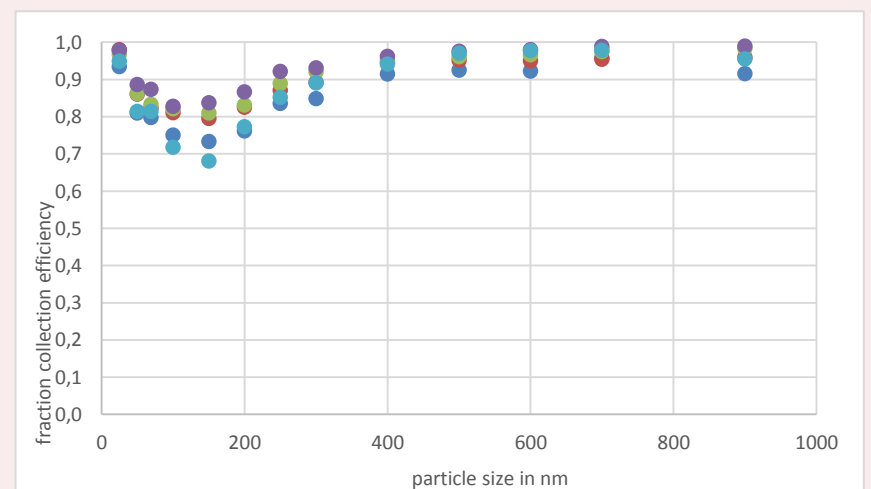
As main variables governing the particle deposition efficiency the following parameters were identified:

- residence time of aerosol in the foam bubbles
- properties of the surfactant
- diameter of the foam bubbles
- particle diameter

The effect of some parameters on the separation curve is exemplified below:



Fractional collection efficiency curves for different gas flow rates



Fractional collection efficiency curves for different surfactant concentrations

### Conclusion:

- Feasibility of particle separation with foam surfaces was shown.
- Main filtration mechanism for the particles is diffusion and therefore sufficiently long dwell times and/or small sized bubbles are required .
- The task for the next step prototype on real flue gas will be to implement the column operation using optimum parameters with moderate pressure drop.

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