

Prof. Dr. rer. nat. et Ing. habil.

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Experimental investigation of a precipitation reaction front

Diplomarbeit/Belegarbeit

Precipitation chemical reactions fronts is an active field of research that constantly calls for new advancements. They are present in numerous technological applications (porous media, reactive mass transfer, CO₂ capturing), but still poorly understood. The potential intern/diplomand will be asked conduct experiments where a calcification reaction between CaCl₂ and Na₂CO₃ give place to the generation of CaCO₃ particles [1]. The reaction takes place inside a thin gap (Hele-Shaw cell) reactor under flow. The macroscopic hydrodynamic features of such systems (Fig.1) and the product's properties (Fig. 2) are of great interest for relevant industrial applications.

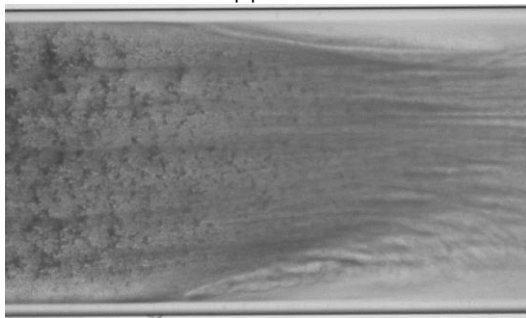


Fig 1: Macroscopic view of a precipitation reaction front in a Hele-Shaw reactor

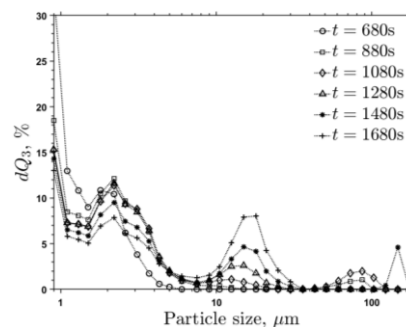


Fig 2: Particle Size Distribution of CaCO₃ particles generated in a Hele-Shaw reactor

The candidate is expected to:

- Conduct experiments in the lab, using different chemical (e.g. reactant concentrations) and hydrodynamic parameters (e.g. flow rates, flow geometries).
- Usage of diverse experimental/processing methods: Laser Diffraction Analysis, Image Processing, Particle Image (or Tracking) Velocimetry (PIV/PTV).

Requirements:

- Study in process engineering, chemical engineering, mechanical engineering (or relative field)
- Basic laboratory experience is expected
- Experience in basic data processing is preferred but not obligatory (i.e. using ImageJ, MATLAB, Python, PIV softwares)
- Motivation, interest in the field, ability to solve problems, good academic track records

Conditions:

- duration min. 6 month, start: Jun/Jul 2023, workplace: TU Dresden

[1] Balog et al. (2019) PCCP **21** 2910

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