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## CO<sub>2</sub> capture and solvent regeneration in gas-liquid vortex unit

### Aim

The experimental study of the applicability of a gas-liquid vortex reactor (GLVR) for Carbon Dioxide (CO<sub>2</sub>) capture and in the consecutive solvent regeneration.

### Justification

In 2016 the Paris Agreement was ratified by the EU. It is a milestone in the EU response to the climate change. The absorption of CO<sub>2</sub> is a challenge. Available CO<sub>2</sub> separation technologies have high cost and technological limitations, restricting their general use in CO<sub>2</sub> capture and Utilization (CCU). In the overall CAPTIN project (<https://moonshotflanders.be/mot3-captin/>) several types of new technologies for CO<sub>2</sub> capture are studied.

Specifically, in the CAPTIN-1 project the use of a vortex reactor for gas-liquid flow was hydrodynamically confirmed. First data on gas-liquid mass transfer parameters of GLVR were gathered. In the CAPTIN-2 project, the GLVR technology will be further studied and optimized to demonstrate a cost-effective CO<sub>2</sub> absorption/desorption process.

### Program

The project aims at gathering a broad set of experimental data in a geometrically optimal GLVR.

- Study of the effect of GLVR geometry on hydrodynamics and CO<sub>2</sub> absorption.
- Study of CO<sub>2</sub> absorption results in the GLVR over a range of operating conditions.
- Study the effect of applied solvents.
- Study of the GLVR for solvent regeneration.
- Energetic study of solvent regeneration in a GLVR.
- Combining absorption and regeneration process in two GLVR.

