Study of post-combustion CO₂ capture process using biphasic solvents applied to cement flue gases

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Context of the study

Overview of phase change solvent technologies

Phase change concept

Simplified process of the IFP Energies nouvelles DMX process

Phase diagram

Demixing solvents categories

Gleshaugen pilot plant of MAPA-DEEA blend

Simplified process thermomorphic biphasic system

Conclusion and future works

Thesis steps

Bibliographic review

Study of the different phase change CO₂ capture process

Focus on biphasic solvents

Identification of the appropriate biphasic solvent

Simulation

- Equilibrium modeling
- Kinetic modeling
- Aspen simulation process of biphasic

Technico-economic investigations

Equilibrium tests

- Kinetic tests
- Absorption-regeneration tests in micro pilot

Determination of equilibrium and kinetic parameters for the simulations

Absorption device

Absorption-regeneration pilot at UMons

Flowsheet of absorption-regeneration process in Aspen plus

As a result of our bibliographic review DEEA-MAA blend was chosen to be studied in a CO₂ demixing solvent process. Equilibrium and kinetic tests will be achieved to determine necessary parameters for thermodynamic modeling and Aspen simulations.

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