CFD Simulation of CO_2 Absorber with Open Source Package

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Carbon capture is the single most important industrial waste treatment process for combating global warming. Absorption of the carbon into liquid solvents has gained global acceptance as the most promising carbon capture technology due to its well-established operation. Computational fluid dynamics has been used to investigate the hydrodynamics of the absorption process and factors that affect its operation. However, only few researches considered the real industrial application of the absorber in their study. To this end, a countercurrent CFD simulation of an MEA absorber based on industrial practices is presented in this work. The liquid holdup, absorption efficiency, and pressure drop were investigated. OpenFOAM, an open source CFD package was used as the software platform to run the simulation owing to its flexibility in implementing several mathematical models that define the process. The results from this simulation were compared to a pilot plant data which showed very good agreement.