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ANALYSIS ON NUMERICAL SIMULATIONS OF CO_2 ABSORPTION PROCESS OF CARBON SOLIDIFICATION SYSTEM

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Abstract. *Carbon dioxide (CO_2) emission control has been a popular topic since global warming affects our living conditions on the planet. Carbon Capture and Storage (CCS) is a feasible solution for mitigating the global warming effect by capturing the CO2 from power stations and industrial processes and storing them underground. There are great many of active CCS projects onshore. International Maritime Organization (IMO) has adopted guidelines for CO_2 emission control by improving ship energy efficiency. The project is aiming to apply CCS on ships by capturing the CO_2 emission from the engine exhaust gases and solidifying them for easy storage. It will enable ships to comply with various regional and international CO_2 emission regulations and also maintain the efficiency of waterborne transportation. The simulation of carbon absorption develops and investigates the multiphase reaction model in CFD software, focusing on bubble column effect with chemical reaction. This paper presents the analysis of the numerical simulation of the CO_2 absorption process. Simulation results illustrate the pressure distribution of solution and gas path and velocity in solution. This numerical simulation results also indicates the impact of environment temperature on chemical reaction rate. A comparison between experiment and simulation results is presented to figure out the impact of initial NaOH solution concentration on gas absorption process. An optimized NaOH solution concentration is figured out and will be used for further practical design of absorption system for ships.*

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