Marine SO_x Scrubber: Design, Simulation and Experiment

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The International Marine Organization(IMO)established regulations on SO_2 emissions in the MARPOL Annex VI.Since 1st January 2015 equivalent Sulphur emissions have to be lower(0.1% in weight)in some coastal regions named “Sulphur Emission Control Areas”, SECAs while from 1st January 2020,sulphur emissions for oceangoing vessels must be equivalent to a sulphur content in fuel lower than 0.5% in weight worldwide.Wet flue gas desulfurization (FGD) process is preferred because it can comply environmental regulation economically.In this work,experiments are performed using scrubber, which has square-based shape and fresh water with addition of sodium hydroxide as absorbent, to treat flue gas from a marine diesel engine(720 kW)that has to comply with current IMO-MARPOLVI 14 regulation for SECAs.The experimental tests in spray column indicate that the absorption efficiency above 95% can be achieved by using liquid-to-gas mass ratio about to 4.32 kg.kg-1. The experimented performances match well with the simulated results. This research was supported by X-mind Corps program of National Research Foundation of Korea(NRF) funded by the Ministry of Science, ICT (2019H1D8A110563011).