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**Master Thesis Defense**

Entitled

*ABSORPTION OF CARBON DIOXIDE VIA SINGLE AND BLENDS OF AQUEOUS AMINE  
SOLUTIONS AND NANOFLUIDS IN GAS-LIQUID HOLLOW FIBER MEMBRANE CONTACTOR*

by

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Abstract

In this work, CO<sub>2</sub> gas was absorbed from a gas mixture (20 vol.% CO<sub>2</sub> + 80 vol.% N<sub>2</sub>) in a custom made Polyvinylidene fluoride (PVDF) hollow fiber membrane contactors by using a variety of single and blends of aqueous amine solutions and nanofluids. An ultrasonic dispersion method was used to prepare nanofluids where SiO<sub>2</sub> nanoparticles and carbon nanotubes (CNTs) were dispersed in deionized (DI) water without adding any surfactant. The prepared solvents were fed into the tube side of the membrane module, whereas the gas mixture was passed through the shell side. CO<sub>2</sub> absorption experiments were carried out using four different liquid flow rates: 10, 20, 30 & 40 ml/min. All experiments were conducted at ambient temperature and atmospheric pressure. CO<sub>2</sub> absorption process carried out by using pure deionized water in the same module was used as a reference. The effects of different parameters on the removal efficiency of CO<sub>2</sub> were investigated and analyzed with a focus on concentrations and types of amines and nanoparticles and liquid flow rates.

**Keywords:** Carbon dioxide, absorption, hollow fiber membrane contactors, amines, nanofluids.