

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this research, the aqueous solutions of different sole alkanolamines and alkanolamines blended with piperazine were applied for CO₂ removal from flue gas via the absorption and regeneration steps. The effects of absorption time, types of alkanolamines, types of alkanolamines blended with piperazine, regeneration temperature on regeneration efficiency, regeneration temperature on CO₂ absorption capacity were examined. Under the experimental conditions, when piperazine was used as an additive in the aqueous solutions of any alkanolamine showed the enhancement of CO₂ absorption capacity. MEA blended with piperazine gave the highest CO₂ absorption capacity of 0.50 mol CO₂/mol amine. The order of CO₂ absorption capacity of different amines was MEA/PZ > MEA > DEA/PZ > DEA > TEA/PZ > TEA. Although the primary amine (MEA) had the highest CO₂ absorption capacity, the regeneration performance was the lowest. The regeneration of the 30 wt.% TEA aqueous solution at 100 °C with a pure N₂ purge showed the best result. Over 90 % of the CO₂ contained in the solution could be desorbed, TEA had the highest regeneration efficiency of 97.68 % in the first cycle with a little decrease in the second cycle.

5.2 Recommendations

The recommendations for future work are as follows:

1. The effect of pressure should be investigated to evaluate the CO₂ absorption capacity.
2. Other types of additives to the sole alkanolamine aqueous solution, such as ionic liquids and carbonate salts, should be studied to compare the CO₂ absorption capacity.