OVERALL CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the important conclusions drawn out of this research work have been summarized and the recommendations for future work are also made.

7.1 OVERALL CONCLUSIONS

1) After the screening studies by performing absorption-desorption experiments, it was found that the five diamine solvents such as AEEA, PZ, HMDA, EDA, DMAPA used in aqueous blends acted as activator resulting the improved performance of DEEA for CO_2 capture.
2) All the entire studied amine blends showed better capture performance than single DEEA and MEA but among the amine blends, DEEA+HMDA absorbent showed better absorption-desorption performance for CO_2 capture.
3) For removing the CO_2 from gas stream, activator has major role and it significantly improves the capture performance of DEEA.
4) The solubility of CO_2 increases with decrease in temperature and increase in CO_2 partial pressure for the selected amine blends DEEA+AEEA, DEEA+HMDA, DEEA+EDA.
5) Total concentration of amine blend solution has less effect in comparison to activator concentration on CO_2 solubility.
6) The blend composition having 0.2 mole fraction of activator in total amine solution showed best performance for CO_2 capture at 303 K and 20 kPa CO_2 partial pressure.

7) The empirical models were developed in the specified range of operating conditions by using experimental results on CO_2 solubility with an average absolute deviation of 1.37%, 7.03% and 2.14% for DEEA+HMDA, DEEA+EDA and DEEA+AEEA blends, respectively.
8) The absorption heat of CO_2 in DEEA+ HMDA blend was found to be -68.84 kJ/mol which is lower than that of DEEA+EDA (-70.50 kJ/mol), DEEA+AEEA (-72.44 kJ/mol) and conventional amine MEA (-84.34 kJ/mol).
9) The DEEA+HMDA blend can be concluded the most effective absorbent for removal of CO_2 from gas stream.

7.2 RECOMMENDATIONS FOR FUTURE WORK

According to the conclusions drawn, the following suggestions can be made for future work in this research field:

1) Kinetics, mass transfer and thermodynamic characteristics of CO_2 in proposed amine blends can be carried out.
2) Proposed amine blends used for CO_2 capture for continuous process can be carried out.
3) Pilot scale study can be carried out for large scale CO_2 capture from gas stream.
4) New absorbents for CO_2 capture should be explored.