

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

All mixed matrix membranes were prepared by solution-casting method and tested the permeabilities and selectivities of CO₂/N₂, CO₂/H₂ and C₃H₆/C₃H₈ at room temperature and single gas measurement.

For the selectivities of all membranes, activated carbon in activated carbon/silicone rubber/polysulfone MMM had a strong effect on CO₂/N₂ selectivity and did not significantly change CO₂/H₂ and C₃H₆/C₃H₈ selectivities. PEG can show the effect to enhance selectivity when PEG suspended in polymer phase of mixed matrix membrane.

For plasticization phenomenon, it was observed that only 30 wt% activated carbon/silicone rubber/polysulfone MMM had a strong hydrostatic compression effect at relatively low pressures. After PEG was added in activated carbon/silicone rubber/polysulfone MMM the permeability of the gas reduced. Plasticization effect of C₃H₈, C₃H₆ and CO₂ decreased with increasing amount of PEG.

5.2 Recommendations

From this work, silicone rubber was used as polymer phase. It showed the low selectivity of olefin/paraffin. Therefore, to further improve the olefin/paraffin separation polyimide is an interesting polymer (Chan *et al.*, 2002). Chan *et al.* used polyimide membrane without support and got the C₃H₆/C₃H₈ selectivity around 10 and 5.8 for C₂H₄/C₂H₆ selectivity. MMM can be used to improve performance of polymer membrane by adding molecular sieve material such as zeolite in membrane.