

## CHAPTER V

### CONCLUSIONS AND SUGGESTIONS

#### 5.1 Conclusions

In this work, the  $MgCl_2$  support was prepared from magnesium ethyl carbonate. The  $MgCl_2$  supported Ziegler-Natta catalyst was prepared and used for ethylene polymerization, a number of conclusions can be drawn as follows:

Ziegler-Natta catalysts were synthesized under different conditions and components. The optimum condition found was  $Al_2Et_3Cl_3:Mg$  molar ratio = 0.5:1,  $Ti:Mg$  molar ratio = 3:1,  $EB:Mg$  molar ratio = 0.12:1, treatment temperature =  $110^\circ C$ , and aging time for 10 h.

Ethyl benzoate as an electron donor was introduced to the reaction. The experimental result showed that the catalysts demonstrated high AB which was suitable for bimodal HDPE production. Dicyclopentyl dimethoxysilane (DCPDMS) which was added while preparing  $MgCl_2$  supports acted as a binding agent.

The main effect of heat treatment was to increase Ti active species. Heat treatment of catalyst could modify the catalyst structure and results in polyethylene with different molecular weights. The treated catalyst showed AB value of 7.2. Addition of EB and DCPDMS while preparing  $MgCl_2$  supports increase size of polymer. Sizes of the catalyst and polymer were  $33\ \mu m$  and  $260\ \mu m$ , respectively. Fine polymer content was reduced to 7 wt %. Molecular weight distribution of polymer produced from this work was broader than that of the commercial one.

## 5.2. Suggestions

The future work should be focused on the morphology control of the supported catalyst to be spherical by using tetraethylorthosilicate. The effect of other electron donor: dichlorodimethylsilane on the MWD of polyethylene should be studied.