

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

1. Propylene polymerizations was performed with magnesium chloride supported Ziegler-Natta catalyst in the present of diethylphthalate and triethylaluminum as internal donor and cocatalyst, respectively, ($MgCl_2/TiCl_4/DEP-TEA$) using hexane, heptane, toluene and xylene as solvent. The activity of catalyst is higher when using aromatic solvent due to higher monomer solubility, whereas the isotacticity of polymer using aromatic solvents is lower due to the higher leaching of internal donor that is used to improve the isotacticity of polymer from catalyst into solvent.

2. The isotacticity of polypropylene changed in different ways with the increase of polymerization temperature when using Ziegler-Natta and metallocene catalysts. In case of metallocene catalyst, the isotacticity of polypropylene is decrease with increasing polymerization temperature due to the increase of chain epimerization. Whereas, for Ziegler-Natta catalyst, the isotacticity of polymer is decrease with increasing temperature in the low temperature range due to the higher leaching of internal donor and then increase in the high temperature range due to the higher catalyst concentration.

3. Series of polymerizations were performed at different propylene pressure. It results in the changing of polymer tacticity. For metallocene catalyst, the increase of propylene pressure results in the increase of the isotacticity of polymer due to the decrease of chain epimerization with increasing monomer concentration. Whereas, in Ziegler-Natta catalyst, the isotacticity of polymer did not change so much in this pressure range.

4. In case of Ziegler-Natta catalyst, the isotacticity of polymer is increase with increasing catalyst concentrations while, for metallocene catalyst, the isotacticity of polypropylene did not change.

Table 5.1 Effects of polymerization conditions on isotacticity of polypropylene

Polymerization Conditions	Catalyst Systems	
	Ziegler-Natta ^{a)}	Metallocene ^{b)}
Effect of Solvent	Using Aliphatic solvents give higher % I.I.	-
Effect of Temperature	%mmmm decrease with increasing temperature in low temperature range and increase in high temperature rang	%mmmm decrease with increasing temperature
Effect of Pressure	Not change	%mmmm increase with increasing pressure
Effect of Catalyst Concentration	%mmmm increase with increasing catalyst concentration	Not change

a) Ziegler-Natta: $\text{MgCl}_2/\text{TiCl}_4/\text{DEP-TEA}$,

b) Metallocene: $\text{SiO}_2/\text{MAO}/\text{rac-Et}(\text{Ind})_2\text{ZrCl}_2\text{-TMA}$.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

5.2 RECOMMENDATIONS

From the results in this work, the further investigation in the following subjects will be useful.

1. The effect of polymerization conditions should further study in the other catalyst systems such as Ziegler-Natta catalyst system with the present of different types of internal and external donors, C_{2v} , C_s and C_1 -symmetry metallocene catalysts.
2. Further study in the effect of different solvents using other solvents that has different polarity such as ortho-dichlorobenzene (o-DCB), triisopropylbenzene(TIPB) and mesitylene(MES).
3. Higher pressure near real industrial operation should be study.



ศูนย์วิจัยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย