CHAPTER V

CONCLUSION

In this study, the best condition to prepare fine catalyst support was at 85 °C with stirring rate 350 rpm. The addition rate of $TiCl_4$ is the crucial step for preparing good catalyst support. Dropwise addition would give fine catalyst support, which easily dispersed with TEA, and good supported catalyst was obtained. In the preparation of Z/N catalyst for producing low molecular weight HDPE, the best result, the highest MFI_5 of HDPE and its reliable activity were achieved when the supported catalyst (R3) obtained by using good catalyst support with [$TiCl_4$] and [$Mg(OC_2H_5)_2$] ratio of 2.5:1. In the case of Z/N catalyst for producing high molecular weight HDPE, higher titanium content on supported catalyst was required. Such catalyst was prepared by using the same catalyst support with the heat treatment before the fluid washing, Furthermore the amount of titanium content on catalyst support could be varied by washing prior to heat treatment. More washing led to less amount of titanium on catalyst supports. Besides, it was found that the catalyst support reacted TEA at 120 °C would give better Z/N catalyst than the one at room temperature for all case of washing time. The lowest MFI_5 of HDPE and its high activity were resulted when the Z/N catalyst derived from the catalyst support that was firstly washed 2 times and subjected to heat treatment, before reacting with TEA at 120 °C. By mixing these two-supported catalysts at various ratios, the molecular weight of each HDPE was

determined. The resulted indicated that at the ratio 9:1 of two types of catalysts (R3:W2HT), HDPE with MWD of 7.1 was resulted. Accordingly, it can be concluded that mixing Z/N catalysts for producing low and high molecular weight HDPE has been proved to be another method for preparation broad molecular weight distribution HDPE without plant modification and no other chemicals than the conventional ones are needed.

Suggestion for Further Work

In this investigation, HDPE from mixed catalyst have broad MWD and the results show possibility ways to approve the broader one. There are many methods for make broader MWD HDPE based on this Z/N catalyst preparation.

1. Variation of cocatalyst amount in catalyst preparation, this parameter leads to oxidation state of titanium control and their amount has different efficiency for ethylene polymerization.
2. Variation of cocatalyst type in catalyst preparation, this parameter leads to oxidation state of titanium control and catalyst activity.
3. Variation of polymerization step such as 2 continuous step polymerization by using different Z/N catalyst efficiency. This procedure can be used for the Z/N catalyst that has effect to the other catalyst.
4. Mixing of catalyst by using different type of catalyst like Z/N catalyst with Phillip catalyst, this procedure could be realized to approve catalyst efficiency for producing broad MWD by using the same polymerization condition.