

CHAPTER V

CONCLUSIONS & RECOMMENDATIONS

5.1 CONCLUSIONS

The ethylene/1-octene copolymerization using MCM-41 supports with boron modification were studied and divided into two parts: *part 1* studied the effect of boron modification on MCM-41-supported dMMAO/zirconocene catalyst during ethylene/1-octene copolymerization with varied boron loading and *part 2* investigated the effect of boron modification on MCM-41-supported dMMAO/zirconocene catalyst during ethylene/1-octene copolymerization on the different pore sizes of MCM-41 supports and the amounts of boron loading were also varied. A number of conclusions may be summarized as follows:

1. For the first part, the enhanced catalytic activity can be achieved via B-modified MCM-41 support for the supported dMMAO/zirconocene catalyst during ethylene/1-octene copolymerization. This is because boron can act as a spacer to anchor the support and dMMAO leading to a decreased interaction. However, larger amounts of B loading turned to a slight decrease in activity due to the migration of Al (dMMAO) into B layer as proven by XPS.

2. In the second part, the copolymerization was carried out on the MCM-41 having small pore and large pore as the supports. It was found that the catalytic activity of the MCM-41 having small pore system was higher than that of the large pore system due to larger amounts of dMMAO present. It can be said that this was attributed to the dispersion of the cocatalyst even though the interaction between $[Al]_{MMAO}$ and supports for the MCM-41 having small pore was larger.

3. The MCM-41 small pore system with B modification gave the higher MW than that of the unmodified one and gave narrower MWD. This was suggested that inhibition of chain transfer reaction during polymerization occurred along with the more uniform catalytic sites present. Conversely, the MCM-41 having large pore system with B

modification gave lower MW than that of the unmodified one, but with the narrower MWD at low content of B. However, at higher content of B, it showed the broader MWD.

4. For both of the MCM-41 having small pore and large pore system with B modification gave block copolymer. The insertion of 1-octene, T_m and crystallinity of polymer produced did not relate to the theory because of the addition of B into MCM-41 support.

5.2 RECOMMENDATIONS

1. The optimization of B content in the supports should be studied.
2. Effect of B on the polymerization reaction without cocatalyst should be investigated.
3. Investigation of other modifier should be further studied.