CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

In this thesis, $IndTiCl_3$ catalyst was synthesized and investigated for the polymerization of styrene. In addition, the role of TMA on the styrene polymerization was also studied. The conclusions of this research can be summarized as follows:

1. TMA acts as initiator and can polymerize styrene by cationic polymerization process.
2. Polystyrene can be produced at TMA concentration over 0.1391 mol/l.
3. The suitable conditions for styrene polymerization with $IndTiCl_3$/MAO catalyst system are the $IndTiCl_3$ catalyst concentration of $2.65x10^{-4}$mol/l, Al/Ti mole ratio of 4,000, and polymerization temperature of $50^{o}C$.
4. The syndiotacticity of the obtained polystyrene with $IndTiCl_3$ catalyst system was higher than that with TMA initiator.
5. Ti^{3+} is the active species for styrene polymerization.
6. The type of polymerization with $IndTiCl_3$/MAO catalyst system was the coordination polymerization whereas that with TMA initiator was cationic polymerization.

6.2. Recommendations

The recommendations for further research may be given as follows:

1. Improve the purification method of the catalyst for improving the catalytic activity.
2. Determine the other cocatalyst, such as $B(C_6F_5)_3$, which can generate the cationic metallocene complex to replace the expensive MAO.

3. Synthesize new half-metallocene catalysts, which are more effective in the styrene polymerization to increase productivity.

4. Develop the method to reduce the amount of cocatalyst (MAO) for half-metallocene catalyst system, such as the immobilization of the metallocene on a support.