

## CHAPTER V

### CONCLUSIONS

Synthesis of NaA zeolite membranes by microwave heating on  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> substrates was influenced by several factors, namely, seed suspension concentration, seeding time, synthesis and synthesis temperature. Seed suspension concentration and seeding time provide the same trend of producing thicker membrane as increasing seed suspension concentration and seeding time. In the case of synthesis time, with fixing the synthesis temperature, NaA zeolite membrane growth started from the semicrystalline formation, followed by the formation of hemisphere-shaped grains and finally the growth process of cubic morphology, which is a fully crystalline layer. Synthesis temperature resulted much more obvious effect. Too low temperature provided no NaA zeolite whereas too high temperature give other zeolite phase called hydroxyl-sodalite. The results from static and dynamic methods of microwave technique showed no difference on morphology because of the limitation of the microwave instrument. However, stirring degree did affect to crystal size. The higher degree of stirring used, the smaller the crystal size obtained. Comparison of NaA membranes synthesized on the  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> supports using different techniques, viz. conventional hydrothermal, microwave hydrothermal and electrophoresis treatments, indicated that the microwave technique can be used to synthesize membrane in much shorter time than others. However, all techniques can be described their layer growths in the same pattern.