CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Porous carbon xerogel was successfully synthesized via soft templating method by using polybenzoxazine as a carbon precursor and triblock copolymer Pluronic P123 as a soft template. Different textural properties were obtained by varying different synthesis parameters which are solvents, concentrations of polybenzoxazine and concentrations of surfactant. The specific surface area and micropore volume could be improved by optimizing the surfactant concentration. All solvents gave porous carbon with the microporous property. Micro-size spherical particles were obtained by using isopropanol as a solvent due to the self-micelle-like formation. In case of using dioxane as a solvent, denser morphology was obtained due to the small difference in solubility parameter between polybenzoxazine and dioxane. Comparing the morphology of polybenzoxazine when synthesized in DMF and dioxane system, looser morphologies with 3D interconnected were obtained in DMF system because of poor miscibility between polybenzoxazine and DMF.

Moreover, we have reported the condition which gave the highest specific surface area and micropore volume by varying pyrolysis temperature and treatment activation under CO_2. After activation under CO_2 at 900 °C, the specific surface area and micropore volume were about four times higher than that of polybenzoxazine-based carbon xerogel without activation process.

Finally, we have study about CO_2 adsorption by loaded activated polybenzoxazine porous carbon that have highest surface area 0.1 g into the stainless steel adsorption chamber which was heated by the furnace in order to reach the adsorption temperatures. He gas was used as a purge gas in this study. The adsorption processes were carried out by using high purity CO_2 gas. The result shown that the CO_2 adsorption result at 1 ATM compare with Zeolite A and AC from Hauchhum and co-worker work at 35 °C, activated polybenzoxazine carbon give higher amount of CO_2 adsorption. So, activated polybenzoxazine carbon is suitable for the CO_2 adsorption application due to contain large amount of micropore.

Monofuctional precursor should be used to prevent the fast growth of polybenzoxazine. Also, the precursor should not have strong intramolecular interaction, for example H-bonding, to allow surfactant to form micelle and generate smaller particle, such as nanoparticles.