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## In situ preparation of nitrogen enriched hierarchically nanoporous carbon from polybenzoxazine precursor for CO<sub>2</sub> capture and storage

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Carbon dioxide capture and storage (CCS) is the technology by which carbon dioxide emissions from power plants are captured and stored for future use. The process could help reduce the greenhouse gas in the atmosphere which is the cause of the climate change. Recently, porous carbons which have micro-mesopores structure, high surface area and high nitrogen sites can enhance the CO<sub>2</sub> adsorption capacities because the basic nitrogen groups can interact with CO<sub>2</sub> gas. In this study, micro-meso porous carbons with high nitrogen content were prepared from polybenzoxazine as a precursor and silica nanoparticles as a hard template to generate mesoporous structure. Polybenzoxazine, an additional cure phenolic resin is an excellent carbon precursor since the molecules can be easily designed to incorporate nitrogen functional groups without complicated synthesis procedures. The morphology of carbons was investigated by FE-SEM. The Autosorp 1-MP carried out to determine the surface area, particle size and pore volume of the resulting nanoporous carbon. The effect of pyrolysis temperature to obtain nitrogen enriched nanoporous carbon was confirmed by using XPS and elemental analyzers. As a result, activated carbon that using 40%wt. silica colloidal template and pyrolyzed at 800°C exhibited high CO<sub>2</sub> uptake (1.233 mmol/g at 30°C, 1 bar). The adsorption of CO<sub>2</sub> was increased because the pyridine and pyridone types of nitrogen reacted with CO<sub>2</sub> gas, as well as physical adsorption of the micro-meso porous structure.

### Biography

Nicharat Manmuanpom is a PhD student at Petroleum and Petrochemical College, Chulalongkorn University in major of polymer science. She graduated with Bachelor's degree from Chulalongkorn University in Department of Chemistry. Much of her work focuses on polybenzoxazine synthesis and its application.

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