

Effect of pyrolysis conditions on gas separation properties of carbon membrane

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Carbon molecular sieve(CMS) is one of the outstanding materials for gas separation membrane to substitute conventional polymers. In our previous study, we developed carbon-silica membrane, which is composed of microporous carbon matrix and dispersed mesoporous silica domains for enhanced permeability and retained selectivity. Along with the superior material, we focused on the effect of oxidation at 400-450°C during the pyrolysis among the preparation conditions like pyrolysis temperature, dwelling time, heating rate, and the atmospheric gases, because it would control the pore size of mesoporous silica domain derived from siloxane groups. Furthermore, the structure-properties relationships are also studied in this research to obtain membrane materials as well as the most proper pyrolysis conditions. To understand and compare their gas separation properties, carbon-silica membranes were characterized by NMR, XPS, BET, and XRD, etc.