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Sorption and pervaporation study of methanol/dimethyl carbonate mixture with poly(etheretherketone) (PEEK-WC) membrane

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Abstract

A dense membrane prepared by using a modified poly ether ether ketone (PEEK-WC) polymer was studied for the pervaporation separation of a binary mixture dimethyl carbonate (DMC) and methanol. Contact angle and mechanical measurements were carried out to study the properties of the membrane as well as SEM analysis to evaluate the surface morphology. The swelling degree of the membrane was studied at different concentrations of methanol. When tested in a pervaporation process by varying methanol concentration and feed temperature, the transmembrane flux was found to be temperature dependent with a value of 0.14 kg/m^{2}h at low concentration of methanol (10 mol%) with its highest separation factor being 13.4 at 30 °C. The flux increased with the increase of the temperature, but the separation factor decreased. Using high concentration of methanol resulted in a high permeance of DMC due to a dragging effect. Selectivity results showed that that the composition of the mixture had a strong influence on the membrane performance.

1. Introduction

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