

## **A biologically inspired hydrophobic membrane for application in pervaporation**

### **Abstract**

An artificial polydimethylsiloxane/polyphenylsulfone (PDMS/PPSU) membrane, which emulates the hydrophobic behavior of natural membranes, was synthesized. Hydrophobicity was achieved by coating the membrane surface sublayer using conventional silicon material, which imitates the character of epicuticular wax (EW) of *Prunus laurocerasus* L. leaves. It was then applied as a separation medium in pervaporation (PV) of diluted mixtures of ethyl acetate and aroma compounds. The membrane's biomimetic characteristics were evaluated using surface morphology analyses, that is, Fourier transform infrared (FTIR), water contact angle measurements, and SEM imaging. A comparison of properties of the membranes synthesized in this work against selected hydrophobic plant leaves indicated a good agreement. PV using these biologically inspired artificial membranes demonstrated preference for the permeation of ethyl acetate. Besides intrinsic characteristics, it was also observed that the chemical potential is highly influential in activating sorption, diffusion, and desorption of a specific compound.

### **Keywords**

Biologically inspired; Hydrophobic membrane; Aroma compounds