

Investigations of rubbery copolyimides for the preparation of asymmetric pervaporation membranes

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ABSTRACT

It is known that membrane technologies may have a major role to play in the development of environmental-friendly processes, either in gas or liquid separations. In liquid separations, one of the challenging issues is to get membranes with suitable separation properties able also to survive to the exposure of liquid solvents at various temperatures. Aromatic polyimides are known to exhibit a very good stability to a great number of solvents, but their permeability are low because of their rigid carbon skeleton and of their low available free volume; so their uses are mainly limited to gas separations or to filtration processes (MF, UF). To broaden the application area of polyimides in liquid separations, we have prepared and studied the properties of a block ether aromatic copolyimide series where the ether soft block acts both as a selective and a permeable block; we describe attempts to get asymmetric polyetherimide (PEI) membranes having molecular separation properties using various experimental conditions of dry/wet phase inversion. The PEI physical properties and morphologies (SEM) are reported together with their pervaporation properties for water–ethanol separation. The PV results showed that rubbery copolyimides can lead to promising asymmetric membranes for liquid–liquid separations.

Keywords: Rubbery copolyetherimides; Phase inversion; Asymmetric PEI membranes; Pervaporation

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