

Pervaporation-aided Esterification of Trifluoroethanol with Methacrylic Acid through New Acid-resistant PVA Membrane

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For the pervaporation-aided esterification of trifluoroethanol (TFEA) with methacrylic acid (MA), new crosslinked acid-resistant PVA membranes were prepared via a crosslinking reaction between poly (vinyl alcohol) (PVA) and ethylene glycol diglycidyl ether (EGDE). For the membrane preparation, PVA/EGDE aqueous solutions were cast and thermally crosslinked to produce acid-resistant polymer networks connected with chemically stable alkyl chains and ether groups. ATR/IR and DSC observations and swelling test were used to characterize PVA membranes prepared with various contents of EGDE. The basic pervaporation properties of the membranes were investigated with TFEA/water, MA/water and pure TFEMA by varying EGDE content and operating temperature. The esterification of TFEA with MA using the PVA membranes was also carried out at a fixed reaction mixture volume and the effect of reaction temperature, catalyst content and initial molar ratio of TFEA/MA on the TFEMA conversion was investigated.