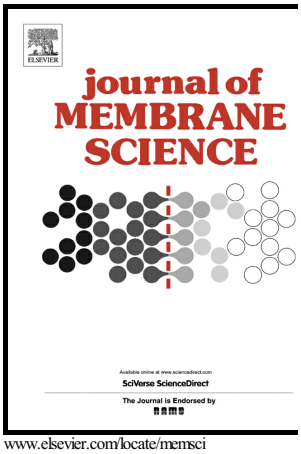

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Hydrophobic networks for advanced proton conducting membrane: synthesis, transport properties and chemical stability

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Abstract

The design of interpenetrated networks (IPN) membranes for fuel cell applications requires both an electrolyte and a neutral network. The composition and architecture of the latter are of major importance for the final IPN membrane properties. In this work, networks based on a fluorinated diepoxy oligomer (DFODDE) and a non-fluorinated triepoxy monomer (TMPTGE) were synthesized. The network composition was varied from 100% DFODDE to 100% TMPTGE, resulting in an increase of the crosslinking density and concomitantly a decrease of the fluorine content. The curing process was optimized to achieve a total epoxy conversion and the chemical structure of the networks was characterized by Raman and Infrared spectroscopies. The physical, thermal and chemical membrane properties were studied and discussed as a function of the crosslinking density and of the fluorine content. Increasing the crosslinking density led to a decrease of the membrane permeability to