

Preparation and characterization of pore filling membranes for vanadium redox flow batteries

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Two kinds of proton permselective polymer electrolytes consisting of cation exchangeable or amphoteric functionals were introduced into porous hydrocarbon substrates and crosslink-polymerized by radical polymerization in this work. Two different types of proton permselective pore-filling membranes with low vanadium crossover were evaluated for vanadium redox flow batteries. The thickness of the prepared membranes was controlled between 20 and 25 micrometers to extremely lower membrane resistances. Finally, film-like polymer electrolyte membranes were prepared. The prepared two different types of pore-filling membranes were examined to compare vanadium co-ion crossover through the membranes. Also, the physico-chemical properties of the prepared membranes such as swelling behavior, membrane area resistance were investigated to apply for charge-discharge performance in correlation with the electrolyte composition.