The reinforced membranes based on Nafion/porous polyvinylidene difluoride (PVdF) membranes

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The reinforced membranes based on Nafion/porous polyvinylidene difluoride (PVdF) were produced for the application of energy storage systems. In the reinforced membranes, Nafion plays the role of proton conductor, and porous PVdF can be used as a supporter that has a strong mechanical stability. For the successful preparation of reinforced membranes, porous PVdF film was modified by potassium hydroxide, which increased the hydrophilicity of porous PVDF film. Enhanced hydrophilicity of PVdF film led to high absorption of Nafion ionomer and high compatibility between Nafion and porous PVdF film. The produced membranes were characterized by dimensional change, water uptake, ion exchange capacity (IEC), and proton conductivity. Additionally, the produced membranes were compared with Nafion 212 as reference membranes in this study.