

## Highly stable ion-exchange membranes containing fluorine moiety for all-vanadium redox flow battery

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All-vanadium redox flow battery (VRFB) is attracting much attention as one of the promising high-capacity battery technologies. Among the components of VRFB, ion-exchange membrane (IEM) is a key material that prevents the undesirable mix of the active materials and controls the redox balance. In particular, since VRFB uses strongly acidic electrolytes, the chemical stabilities of the IEMs should be excellent. In this study, therefore, we have developed novel reinforced IEMs using physically and chemically stable porous supports for VRFB applications. Especially, it was intended to increase the oxidative resistance of the IEMs by adding a fluorine moiety to the ionomer. The prepared IEMs showed low ion transfer resistance and excellent chemical and physical stabilities, simultaneously. When applied to VRFB, it was confirmed that the charge and discharge performances were superior to that of the commercial membrane. This work was supported in part by the MOTIE (No.10047796) and the MOE (No.2017000140002/ RE201702218).