Improvement of the proton conductivity of crosslinked organic/inorganic hybrid membrane for redox flow battery

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The redox flow battery is one of the efficient energy storage systems that can smooth daily and seasonal load fluctuations of renewable energy. One of of the most important property of ion exchange membrane in the redox flow battery is proton conductivity. The easiest way to improve proton conductivity is making sulfonation degree of SPEEK (sulfonated poly(ether ether ketone)) higher. However, sulfonation degree is getting higher, that membrane is getting harder to deal with. It makes sulfonation degree of membrane limited. In this study, surface modification of silica particles in SPEEK membrane is applied to improve proton conductivity with decreasement of sulfonation degree. Silica surface modification could be confirmed by FT-IR, and proton conductivity enhancement is noticed in measurement.