Effect of surface modified TiO_2 as a filler for high temperature PEMFC

이상래, 한학수†
연세대학교
(hshann@yonsei.ac.kr†)

In developing membranes for use in high temperature PEMFC, proton conductivity is one of the most important factors when evaluating the membrane's performance, as it directly leads to improved ohmic resistance. Inorganic fillers excel as fillers due to their chemically inert nature and usually has little effect on the chain matrix at sufficiently low concentration, thus their incorporation can result in increased performance without hindering other factors such as mechanical stability. In this study we have synthesized titanium oxide based filler with sulfuric acid-silane modified surface to increase proton availability and alter its agglomeration behavior. The doping level and proton conductivity has been measured to evaluate its performance as a polymer electrolyte membrane. Increase in performance was observed at optimal loading of 2%; doping loading improved from 7.9 acid doping level to 10.5 and proton conductivity of 0.048 S/cm compared to neat value of 0.039 S/cm with no loading. Samples with higher loading showed reduced performances due to agglomeration.