

Characterization and review of proton conductivity performance by adding heteropolyacid to the silica in 2.5-Polybenzimidazole composite electrolyte membranes for fuel cell

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The method to form stable proton conducting materials constituted of tungstosilicic acid and mesoporous silica was investigated and reported here upon. These materials, after preparation, were characterized in order to make an evidence their intrinsic structures and intimate relation with proton conductivity. One out of four testing group, 50wt.% of tungstosilicic acid on SiO₂ in combination with 2.5-polybenzimidazole for the preparation of proton conducting membranes resulted in highest proton conductivity and preparable characteristics as well. These membranes were thermally stable and the conductivity on a membrane sample having 50wt% of inorganic heteropolyacid composed proton conductive membrane gave a value of 3.86×10^{-2} S/cm at 150°C without humidity impose. The introduction of heteropoly acid on the polymer groups increased the proton conductivity to the membranes