

Synthesis of Heteropolyacid composite membrane by utilizing Imidazole modified Mesoporous silica

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Heteropolyacids (HPAs) are one of the most attractive materials because of the highly conductive and thermally stable properties in crystalline form. However, HPAs has a limitation of practical use in Fuel cells, especially PEMFC (polymer electrolyte membrane fuel cell), due to its high solubility in water. Thus, the insoluble HPAs which also possess good proton conducting property is getting more attention for PEMFC applications. Therefore, we have investigated the potential of stabilizing tungstophosphoric acid (PWA) on imidazole modified mesoporous silica. The physical and chemical structure of the stabilized HPA composite are confirmed by XRD, FT-IR and BET etc. The developed HPA composite is utilized to a polymer electrolyte membrane as a proton conducting additive, casted with commercial Aquivion<sup>TM</sup> solution. To prove the conductive property of the composite membranes, four-probe method was used to measure proton conductivity of membranes at severe conditions of high temperature and low relative humidity.