Synthesis and Characterization of Polyimide Containing Benzimidazole for PEMFC

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In this work, to synthesize new membrane for PEMFC (Polymer electrolyte membrane Fuel cell), new benzimidazole diamine (5-(1H-Benzimidazole-2-yl)-pentan-1-ol, BIYP) with a three-step procedure was synthesized and completed to make a polyimide membrane doped directly with a different amount of phosphoric acid (H3PO4). The result of 5-(1H-Benzimidazole-2-yl)-pentan-1-ol (BIYP) was confirmed by 1H-NMR and FT-IR. Polyimide and synthesis of BIYP and PI was confirmed by FT-IR. We also investigated thermal stability using TGA. The conductivity depending on the temperature, the acid contents of phosphoric acid was analyzed with Impedence Analyzer.
The characteristics of polyimide electrolyte membranes containing benzimidazole (BPI) doped with phosphoric acid (H3PO4) in the structural repeat unit have been investigated as a function of the proton charge carrier at the high temperatures.