

Dependence of Ionomer Loading on the Hydrogen Generation Rate of a Proton Exchange Membrane Electrolyzer

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Abstract : Membrane electrode assemblies MEAs for proton exchange membrane PEM water electrolyzers were prepared by employing 175um perfluorosulfonic acid PFSA membranes as the PEM, onto which iridium oxide catalyst was coated on one side as the anode and platinum catalyst was coated on the other side as the cathode. The cathode catalyst ink was prepared so that the weight ratio of the catalyst powder to ionomer was 75:25, 70:30, 65:35, 60:40, and 55:45, respectively. Whereas, the ratio of catalyst powder to ionomer of the anode catalyst ink keeps constant at 50:50. All the MEAs have a catalyst coated area of 5cm*5cm. The test cell employs a platinum plated titanium grid as anode gas diffusion media; whereas, carbon paper was employed as the cathode gas diffusion media. The measurements of the MEA gases production rate were carried out by holding the cell voltage ranging from 1.6 to 2.8 volts at room temperature. It was found that the MEA with cathode catalyst to ionomer ratio of 65:35 gives the largest hydrogen production rate which is 2.8mL/cm²*min.

Keywords : electrolyzer, membrane electrode assembly, proton exchange membrane, ionomer, hydrogen

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