

Hong Leelasupakorn 2008 : The Activation Losses in a Proton Exchange Membrane Fuel Cell. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Terdthai Vatanatham, Ph.D. 81 pages.

The activation loss in 5 cm² proton exchange membrane fuel cell was studied. The effects of the temperature and the catalyst loadings on the activation loss and other losses in the fuel cell were investigated. In this study, fuel cells were fabricated by using the catalyst loadings of 0.2, 0.3, 0.4, and 0.6 mg/cm² and operated at 60, 70, and 80 °C. It was found that the cell performance increased with the cell temperature and the catalyst loadings. The increasing in the temperature and the catalyst loading decreased the activation loss, crossover loss, ohmic loss, and total resistance in the fuel cell but increased the exchange current density leading to increasing in the cell potential. The empirical model was developed from the relationship among temperature, catalyst loading, and cell performance. This model is able to estimate the activation loss and cell performance accurately to within 1.4% error.

Student's signature

Thesis Advisor's signature

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