

## Two-Phase Model Development for Predicting Flooding Phenomena in Proton Exchange Membrane Fuel Cell

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This paper reports further studies of water management of the proton exchange membrane fuel cells to understand and investigate the effects on key factors, which governs the cell polarization. In this study, a two-dimensional, two-phase model for the analysis of the mass and charge transfer inside proton exchange membrane fuel cell was developed using a commercially-available computational fluid dynamics code, Fluent®. The model was validated with experimental data sets taken from literatures. Using the validated model, analysis of key parameters, such as thickness of polymer membrane, relative humidity of inlet flow, operating temperature, and contact angle of the gas diffusion layer have been conducted to investigate influences on cell performance. Consequently, these parameters crucially affect on water transport inside PEM fuel cell, which leads to enhancement of cell performance.