

Effect of Process Conditions on the Performance of PEMFC

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Theoretical analysis of proton exchange membrane fuel cell (PEMFC) that will be capable of a next-generation energy source has been developed through three dimensional numerical simulations. Simulations are carried out by changing geometry and process condition in a single cell, in order to examine effects of them on the performance of fuel cell. Serpentine channel configuration affects fluid dynamics of fuel and air by the reaction and mass transport through flow channel and gas diffusion layer (GDL). Based on flow dynamic behaviors of species and electrochemical reactions, some strategies for better performance of PEMFC have been explained with thermal distribution, current density production and various local features. Also, the effect of relative humidity is also discussed for the optimal control of GDL flooding which resists flow dynamics.