

# Optimization of the Operating Parameters of a Proton Exchange Membrane Fuel Cell for Maximum Power Density

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*The performance of fuel cells can be significantly improved by using optimum operating conditions that maximize the power density subject to constraints. Despite its significance, relatively scant work is reported in the open literature on the model-assisted optimization of fuel cells. In this paper, a methodology for model-based optimization is presented by considering a one-dimensional nonisothermal description of a fuel cell operating on reformat feed. The numerical model is coupled with a continuous search simulated annealing optimization scheme to determine the optimum solutions for selected process constraints. Optimization results are presented over a range of fuel cell design parameters to assess the effects of membrane thickness, electrode thickness, constraint values, and CO concentration on the optimum operating conditions.*

[DOI: 10.1115/1.1867978]