SIMULATION OF HEAT TRANSFER EFFICIENCY FOR NOVEL AIR COOLING CHANNELS OF A FUEL CELL BIPOLAR PLATE

WIMI AKAM

(2006863727)

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Faculty of Mechanical Engineering

Universiti Teknologi MARA (UiTM)

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ABSTRACT

This study focused on designing and simulating a suitable air cooling for fuel cell bipolar plate with power rating of 3kW. For 3kW application, normally the fuel cells uses water as a medium to remove the heat generated. Instead of using water, air is to be used as a cooling medium. Simulation works are conducted to determine which design will gives the better result of heat transfer rate using air cooling. Two of the alternative design are zigzaged and inclined 2 degree channels. The lower the temperature at outlet will result in higher heat tansfer effeciency of the fuel cells. To obtain the result, two dimension steady state computational fluid dynamic analysis using two equation turbulence model (k-ε model). The work uses Star Design; an CFD software to estimate the temperature distribution at the surface of the bipolar plate. The result shows that design 2 which is having slightly inclined of 2 degree gives the most highest heat transfer rate.

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