Heat and water management of 1 kW-class direct methanol fuel cell stack

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The heat and water management of the 1 kW-class direct methanol fuel cell (DMFC) system was investigated. The system consists of 1 kW-class DMFC stack and a number of support components, including liquid pump, blower, methanol sensor, and methanol/water mixing chamber. Based on the experimental measurements, heat and mass balance was calculated in and around the stack to obtain the optimal capacity of anode and cathode heat exchangers. Capacities of two heat exchangers were determined to maintain the stack temperature and the water content in the fuel mixing chamber. In addition, system operating conditions such as a methanol solution concentration, a fuel feeding stoichiometric factor are proposed for stable operation of the DMFC system.