

Effect of Air-Supply Conditions
on Current Distribution in a PEMFC Electrode
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An emerging class of polymer electrolyte membrane fuel cell (PEMFC) is designed for low power applications such as a portable power source and replacement for a secondary battery without humidification and cooling systems. In order to build a simple fuel cell stack, oxygen has to be supplied from air to a cathode by natural convection and diffusion, which means air-breathing fuel cell stack. Since the current production of a fuel cell is directly proportional to the oxygen concentration in a air stream, inadequate air-flow results in a heterogeneous current distribution in a fuel cell. In the present work, the effects of air supply condition on current distribution in a PEMFC were investigated. For this purpose, the air-breathing single cell with a cathode flow field was fabricated and current and temperature in every segmented cell were measured as a function of air supply condition. In addition, the effect of gas diffusion media on the distributions was investigated. The profile of current and temperature was discussed in terms of mass transport and maintenance of humidification in a cell.

1. M. S. Wilson and J. K. Neutzler, *US patent 5595834*, 1997.
2. M. Noponen, T. Mennola, M. Mikkola, T. Hottinen and P. Lund, *J. Power Sources*, 106, pp. 304-312 (2002).
3. Y.-G. Yoon, W.-Y. Lee, T.-H. Yang, G.-G. Park and C.-S. Kim, *J. Power Sources*, 118, pp.193-199 (2003)