



Letter to the Editor

Comment on “A strategy of estimating fuel concentration in a direct liquid-feed fuel cell system” [Y.J. Chiu, H.C. Lien, *Journal of Power Sources* 159 (2006) 1162–1168]

ARTICLE INFO

Keywords:

Direct methanol fuel cell
Concentration
Performance degradation

ABSTRACT

The strategy for estimating the methanol concentration provided by Chiu and Lien [Y.J. Chiu, H.C. Lien, *Journal of Power Sources* 159 (2006) 1162–1168] overlooks the performance degradation (PD) of a direct methanol fuel cell (DMFC). In addition, the method may not be suitable in practice.

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The strategy for estimating the methanol concentration in a direct methanol fuel cell (DMFC) proposed by Chiu and Lien [1] is based on the assumption that the performance of a DMFC does not degrade. In fact, the cell voltage will always go down after a few hours operation due to performance degradation (PD) [2–5]. For example, the voltage change with time for a DMFC stack developed at Motorola is shown in Fig. 1 [2]. Consequently the concentration estimated by Chiu and Lien's method might be less than the true concentration after the cell has been working a few hours. When developing the strategy for estimating the methanol concentration, the authors should take the PD into consideration. However, it will be a difficult task as the degradation rate of a DMFC is affected by many working factors.

Even if the proposed strategy for estimating the methanol concentration, based on cell performance, is able to give a true value it may still be difficult to perform well in practice and does not have the advantages of “minimizing the cost, mass, and volume of the system” as the authors claimed. This is because the strategy

requires that the flow rates of fuel and air are specified or precisely measured. It is undeniable that the authors can either use metering pumps or add additional flow meters into the system to achieve the extreme operating conditions that the method required. But all of these can increase the cost and volume of the DMFC system.

In addition, a minus sign is missed out between the first square brackets and second square brackets in Eq. (5).

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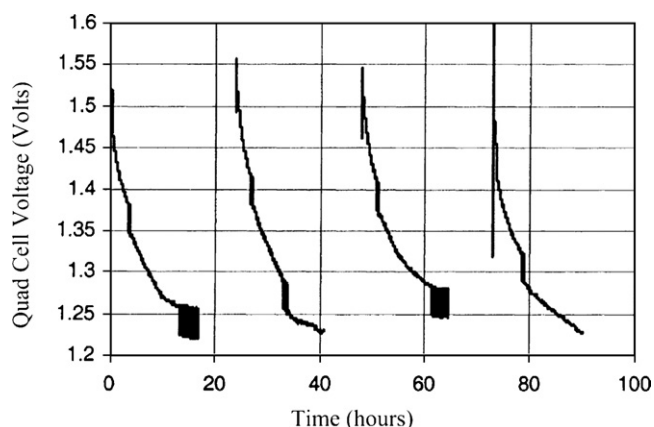


Fig. 1. The quad cell voltage as a function of time. Every 17 h, the air supply to the cathode was turned off for 7 h [2].

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9 July 2008

Available online 27 August 2008