

322e Micro-Channel Fuel Processor for Portable Fuel Cells

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There is considerable interest in the development of micro-scaled fuel processors to generate H_2 for portable fuel cells [1, 2]. The volume and mass of these processors has been limited by the performance of the catalysts. The goals of work described in this paper were to develop highly active and selective autothermal reforming, water gas shift and preferential oxidation catalysts, and deploy these materials in thermally integrated, micro-channel reactors capable of producing 100-200 W of H_2 -rich gas for a proton exchange membrane (PEM) fuel cell. The catalysts were coated onto microporous Fe-Cr metal alloy foams then placed into channels within the micro-reactors.

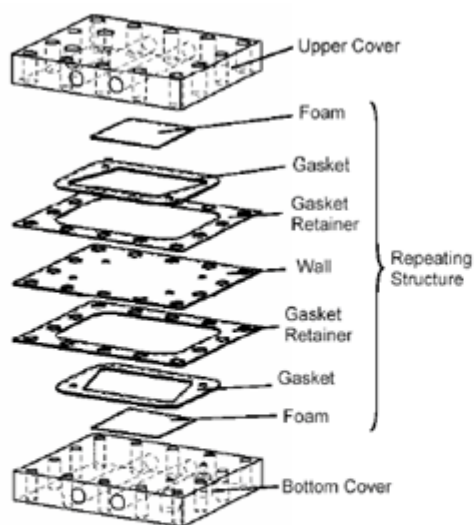


Figure 1. Schematic diagram of the micro-channel reactor

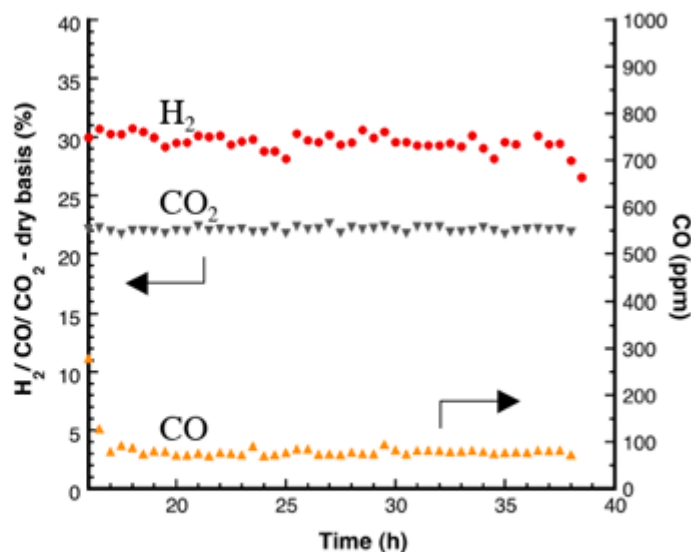


Figure 2. Performance of 100 W fuel processor

The micro-reactor is illustrated in Figure 1, and the performance of the full fuel processor is illustrated in Figure 2. The H_2 -rich product gas contained less than 100 ppm CO. The hydrogen efficiency of the system exceeded 70%. These and other details will be described in the paper.

[1] L. R. Arana, S. B. Schaevitz, A. J. Franz, M. A. Schmidt and K. F. Jensen, *J Microelectromech S* 12 (2003) 600.

[2] D. R. Palo, J. D. Holladay, R. T. Rozmiarek, C. E. Guzman-Leong, Y. Wang, J. L. Hu, Y. H. Chin, R. A. Dagle and E. G. Baker, *J Power Sources* 108 (2002) 28.