

#### **4bt Micro Fuel Cells for Portable Applications**

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Micro fuel cells are candidate power sources of high energy density for portable applications. Recent advances in micro fuel cells have focused on downscaling of fuel cell components. Alternatively, integrated microfabricated and microfluidics-based micro fuel cells have been reported for these applications. In this presentation the microfabrication and characterization of silicon-based fuel cells, in which key components including the flow fields, current collector, and catalyst support structures are integrated onto a single chip, will be presented [1]. Moreover, the optimization of electrodeposited catalyst structures for Si-based micro fuel cells, and efforts to minimize the parasitic losses during fuel cell operation will be discussed.

Secondly, we have reported a novel laminar flow-based fuel cell (LF-FC) [2]. The use of laminar flow in a fuel cell eliminates the need for a proton-conducting membrane. These LF-FCs studied to date exhibit severe cathodic limitations due to poor solubility of oxygen in aqueous media. Here, methods to overcome mass transfer related limitations at the cathode to improve the performance of LF-FCs will be reported.

[1] Yeom, J.; Mozsgai, G. Z.; Flachsbar, B. R.; Choban, E. R.; Asthana, A.; Shannon, M. A.; Kenis, P. J. A. *Sensors and Actuators, B*, 2005, 107, 882-891.

[2] Choban, E. R.; Markoski, L. J.; Wieckowski, A.; Kenis, P. J. A. *Journal of Power Sources* 2004, 128, 54-60. US Patent 6,713,206