Measurement of Localized Current Distribution Applied to a Vanadium Redox Flow Battery

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Redox flow battery systems are under intense development for application as large-scale energy storage systems [1]. Much recent progress in the performance and understanding of these systems has been achieved, and larger-scale operating prototypes exist. However, there is a dearth of experimental diagnostics which enable understanding of the fundamental mechanisms which govern the ultimate performance of these systems. In particular, methods for measurement of distributed current, species, and reaction are needed.

In this talk, a methodology for measurement of the in-plane distribution of current in an operating redox flow battery using a printed circuit board will be discussed. This technology has been successfully implemented in polymer electrolyte fuel cells, and is applied to a redox flow battery system in this work. Knowledge of the distribution of current as a function of flow field design and operating conditions is vital to improved design configurations, for fundamental understanding, and for detailed computational model validation. The distributed performance of an all-vanadium redox flow battery system will be discussed as a function of flow rates, and flow field design.

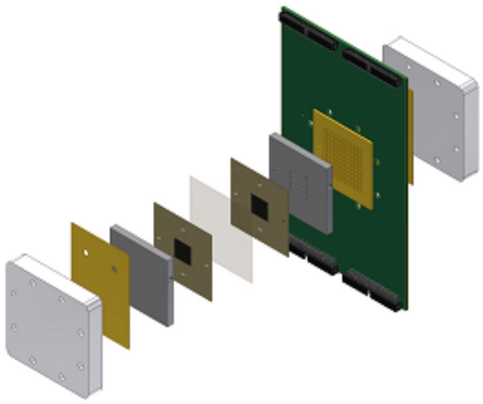

Figure 1. Schematic of the distributed current board applied to a vanadium redox flow battery

1. A. Z. Weber, M. M. Mench, J. P. Meyers, P. N. Ross, J. T. Gostick and Q. Liu, *Journal of Applied Electrochemistry*, **41**, 1137 (2011).