Electronic Supplementary Material (ESI) for Chemical Communications


Electronic Supplementary Information (ESI)

# *In-situ* potential distribution measurement in an all-vanadium flow battery

**Qinghua Liu[a], Ahmet Turhan[a], Thomas A. Zawodzinski[a,b], Matthew M. Mench[a,b,*]**

[a] *BRANE Lab, Department of Mechanical, Aerospace and Biomedical Engineering and Department of Chemical and Biomolecular Engineering, The University of Tennessee, Knoxville, Tennessee 37996, USA*

[b] *Emissions and Catalysis Research Group, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831, USA*

[*] *Corresponding author, Fax: +1 865 974 5274; Tel: +1 865 974 6751; E-mail: mmench@utk.edu*

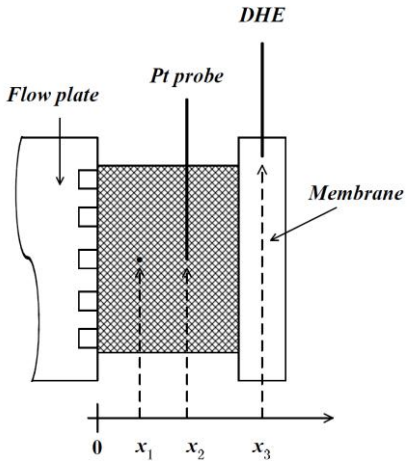


**Fig. S1** Schematic of how to calculate potential from probes and potential within the porous carbon paper electrode. $x_1$, $x_2$ and $x_3$: X-axis values of certain point inside in the porous electrode, the center point of Pt probe surface and the center point of dynamic hydrogen electrode.

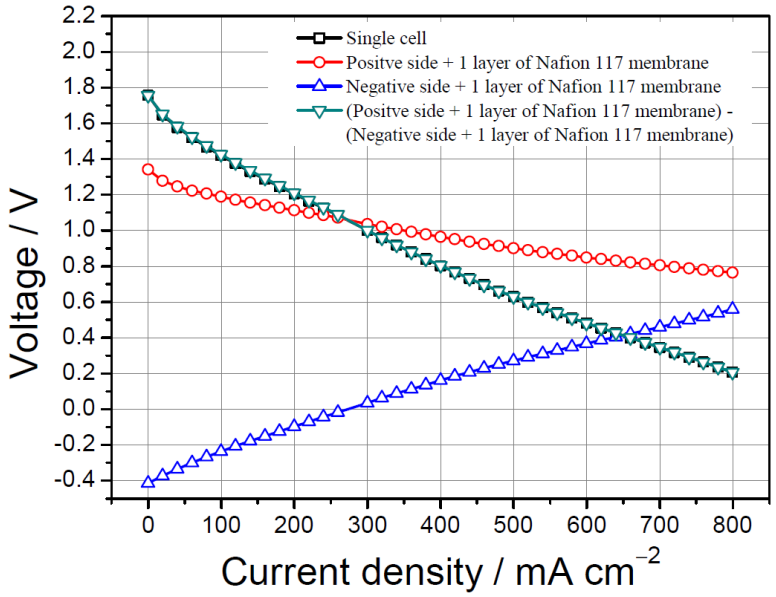


**Fig. S2** Polarization curves of whole single cell, positive and negative sides referred to the DHE and sum of polarization curve of positive and negative sides. This figure shows that the sum of both sides overlaps the cell potential perfectly, and indicates the reference electrode works well.

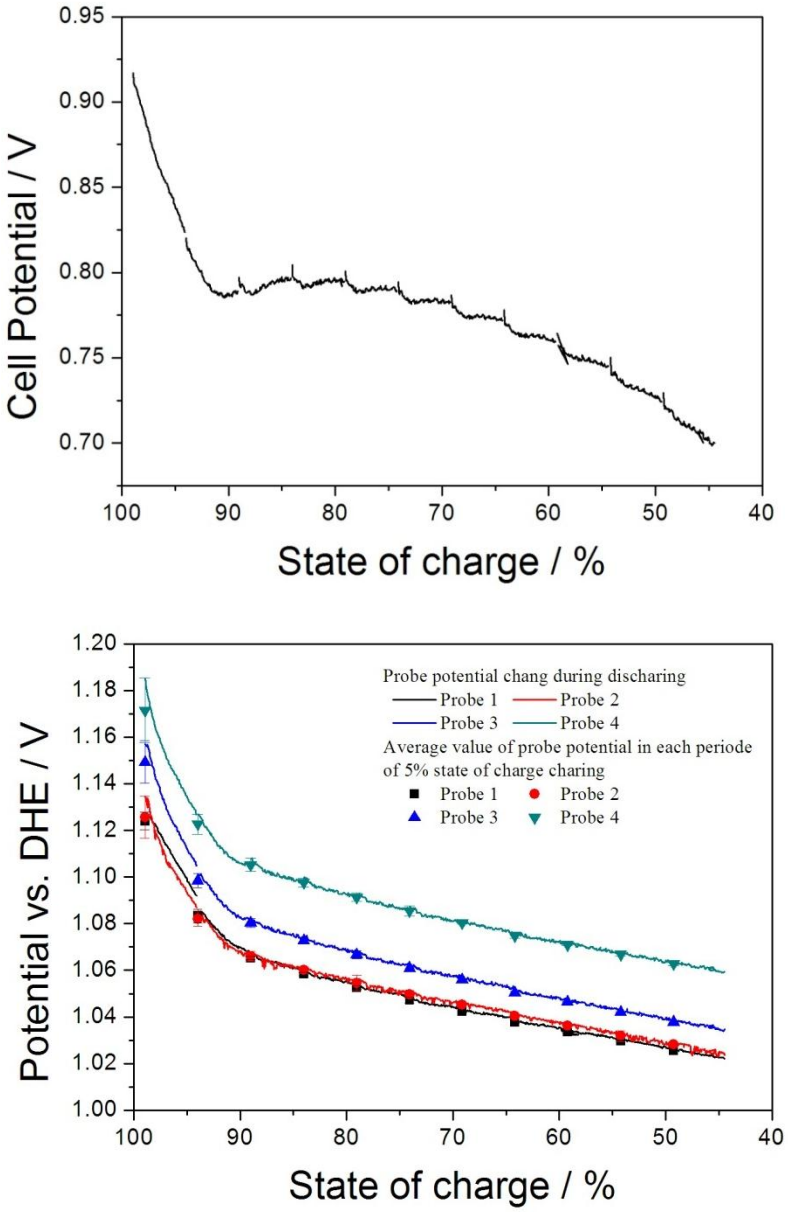


**Fig. S3** (Top) The cell voltage vs. SoC during discharging process at – 400 mA $cm^{-2}$ and (Bottom) potentials from all four probes measured simultaneously at the positive side. The averaged values of probe potential in 2 minutes (SoC was reduced by around 5%) are also shown in the bottom figure. The probes show a fast response and are very sensitive to small changes in conditions.