Electronic Supplementary Information

Structure-property relationship study of Nafion XL membrane for high-rate, long-lifespan, and all-climate vanadium flow batteries

Lihong Yu,*a Feng Lin,a Ling Xua and Jingyu Xib

a School of Applied Chemistry and Biological Technology, Shenzhen Polytechnic, Shenzhen 518055, China. E-mail: yulihong@szptu.edu.cn

b Institute of Green Chemistry and Energy, Graduate School at Shenzhen, Tsinghua University, Shenzhen 518055, China. E-mail: xijy@tsinghua.edu.cn
**Fig. S1.** Photographs of Nafion XL membranes: (a) as-received membrane; (b) immersed in DI water; (c) wet membrane.

**Fig. S2.** Photograph of the VFB single-cell (left) and Nyquist plots of VFBs assembled with as-received and wet Nafion XL membranes (right).

**Fig. S3.** Rate performance and cycling stability of VFBs assembled with as-received and wet Nafion XL membranes.