Supplementary Information

Material Selection and Optimization for Highly-Stable Composite Bipolar Plates in Vanadium Redox Flow Batteries

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Table S1. Physical properties of various conductive materials used in the composite bipolar plate fabrications.

No.	Sample name	Particle size	Shape	Source
1	Natural graphite	average < 80 μm	Flake type	QKG-196,GK graphite
2	Natural graphite	average < 20 μm	Flake type	Cond20, GK graphite
3	Natural graphite	average < 5 μm	Flake type	Cond5, GK graphite
4	Artificial graphite	average < 20 μm	Spherical type	MCMB, Oaska gas
5	Artificial graphite	average < 20 μm	Flake type	AGP-3, *BTR*
6	Exfoliated graphite	average < 3 μm	Flake type	ES 100, GK graphite
7	Ketjenblack carbon	average < 50 nm	Spherical type	EC-600-JD, Akzo nobel
8	Carbon fiber	average 7-10 μm	Fiber type	CF-20-3, Nippon carbon

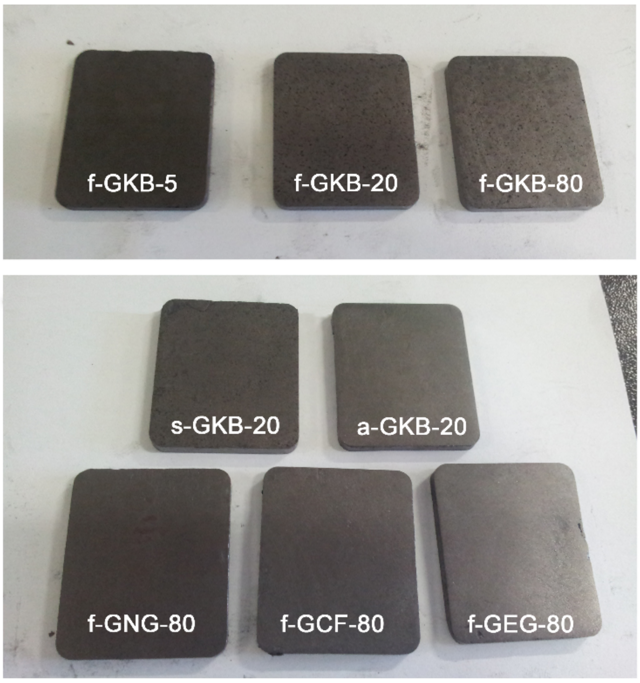

Figure S1. The digital photograph of the as-prepared composite bipolar plate samples (3×4 cm^2 with thickness of 0.3 cm).

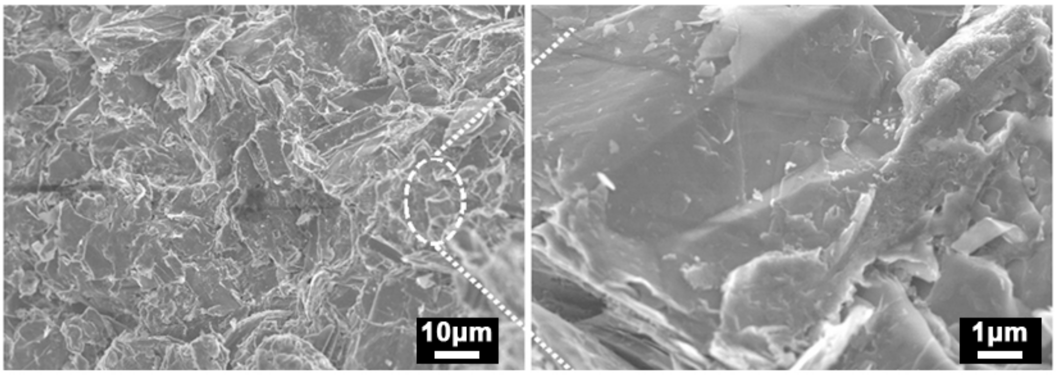

Figure S2. SEM image of the fractured a-GKB-20 composite bipolar plates with magnified image.

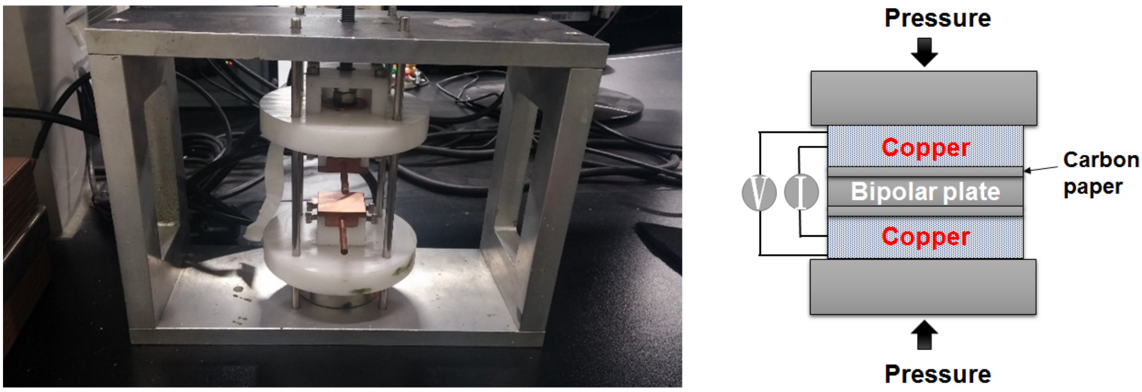

Figure S3. Test setup for through-plane measurement was designed in our laboratory

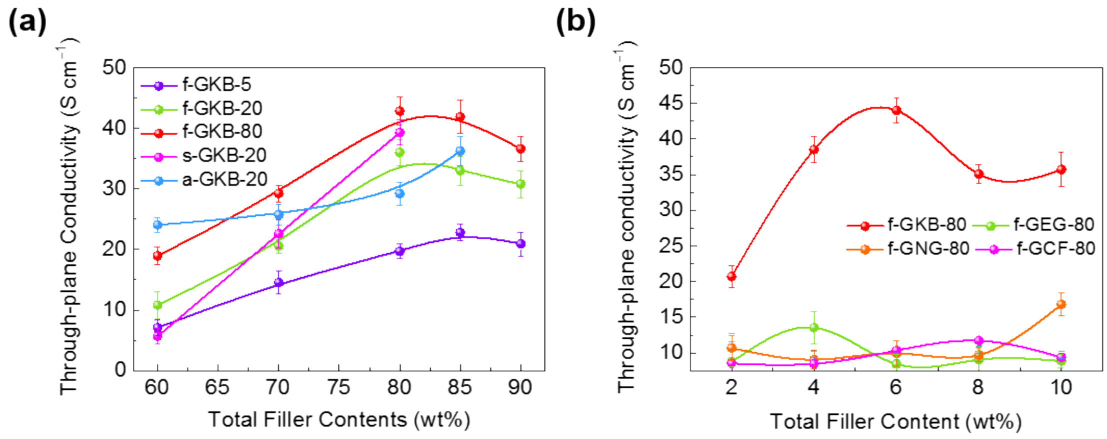

Figure S4. Through-conductivity of composites. Effect on (a) major filler types and (b) minor filler types versus total filler contents. Every data point is an average of five individual measurements and the error bar represents the standard deviation of the mean.

Figure S5. Stability test of the as-prepared bipolar plates in vanadium electrolyte solution at 80 °C for a week.