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Supporting Information

Achieving gradient-pore-oriented graphite felt for vanadium redox flow batteries: meeting improved electrochemical activity and enhanced mass transport from nano to micro scale

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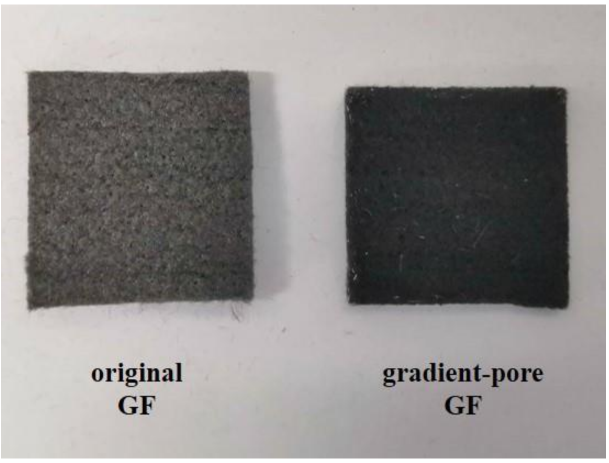

Fig. S1 Digital photos of pristine and gradient-pore graphite felt electrodes.

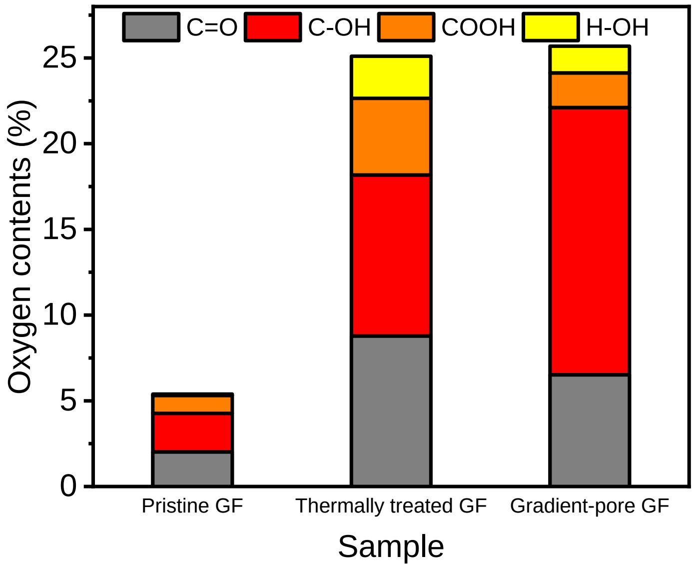

Fig. S2 Distribution and composition of types of oxygen-functional groups in all element on pristine graphite felt, thermally treated graphite felt and gradient-pore graphite felt.

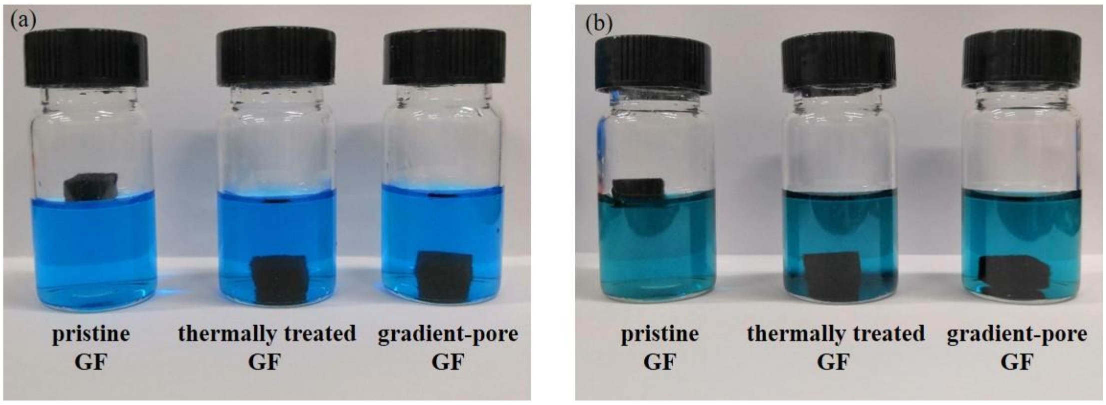

Fig. S3 Electrolyte accessibility of three electrodes in (a) anolyte and (b) catholyte.

Fig. S4 Contact angle measurement of the (a) pristine graphite felt, (b) thermally treated graphite felt and (c) gradient-pore graphite felt.

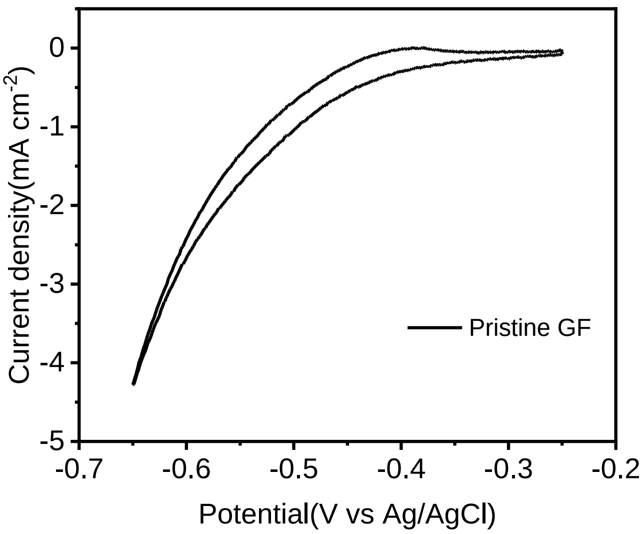

Fig. S5 CV curve of the pristine graphite felt with the potential windows of -0.7 to -0.2 V.

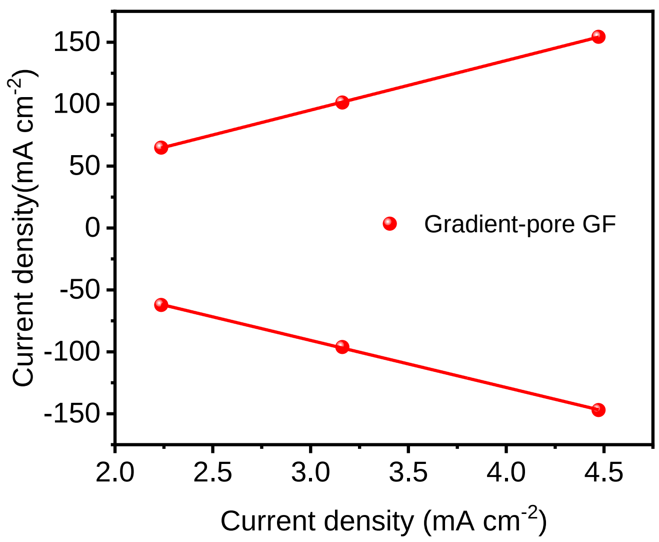

Fig. S6 Plots of the redox peak current density versus the square root of scan rate for gradient-pore graphite felt in positive electrolyte.

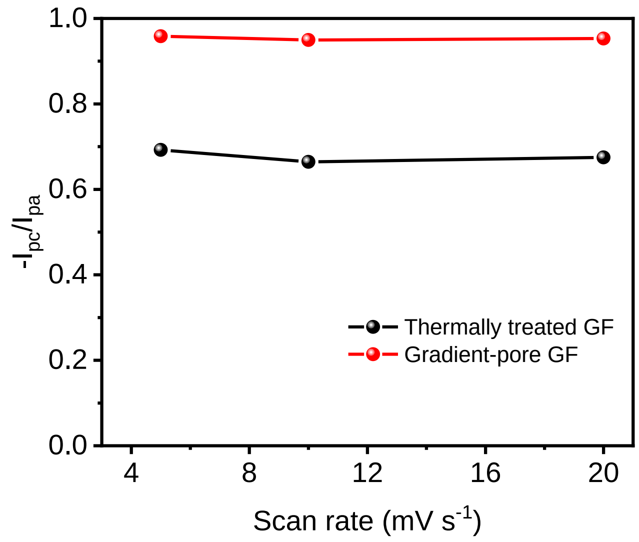

Fig. S7 -I_{pc}/I_{pa} values of the redox peak current density versus the square root of scan rate for thermally treated graphite and gradient-pore graphite felt in positive electrolyte.

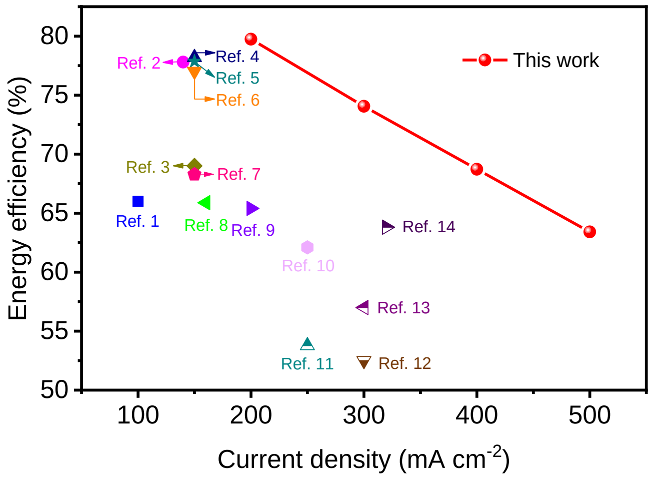

Fig. S8 Comparison of VRFB with gradient-pore graphite felt electrodes with previous works.

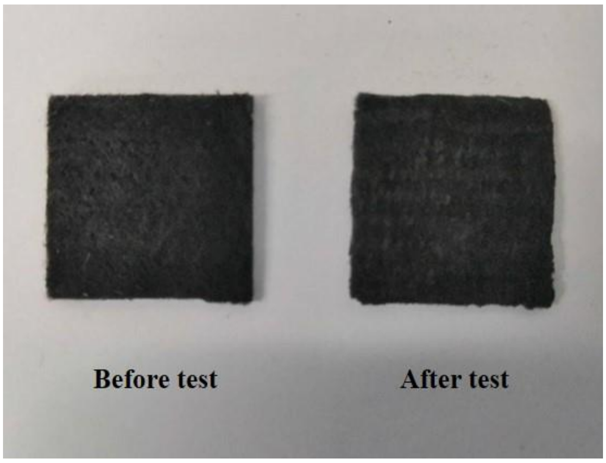

Fig. S9. Digital photos gradient-pore graphite felt electrode before and after cycling tests.

Table. S1 Experimantal parameters of comparied works.

Ref.	Sample	electrode size	membrane	electrolyte	flow rate
1	**CNF-CNT/GF**	5 cm^2	N117	2.0 M	/
2	**CO_2 treated CP**	5 cm^2	N117	2.0 M	50 mL min^{-1}
3	**Graphene/CF**	25 cm^2	N115	1.5 M	60 mL min^{-1}
4	**Bi/GF**	5 cm^2	N117	1.6 M	30 mL min^{-1}
5	**rGO/GF**	25 cm^2	N117	3.0 M	30 mL min^{-1}
6	**SnO_2/GF**	25 cm^2	N117	3.0 M	50 mL min^{-1}
7	**N-CB-CF**	25 cm^2	N115	2.0 M	60 mL min^{-1}
8	**Nb-WO_3/GF**	10 cm^2	N115	2.0 M	20 mL min^{-1}
9	**TiO_2-C/GF**	25 cm^2	N115	1.5 M	60 mL min^{-1}
10	**ZrO_2/GF**	4 cm^2	N211	1.1 M	/
11	**PF-GF**	12 cm^2	N115	1.5 M	20 mL min^{-1}
12	**NCS/GF**	4 cm^2	N212	1 M	46 mL min^{-1}
13	**FeOOH treated GF**	4 cm^2	N115	0.75 M	/
14	**B_4C/GF**	5 cm^2	N117	2 M	50 mL min^{-1}

References

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