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Supplementary information

A self-stabilized suspension catholyte to enable long-term stable Li-S flow batteries

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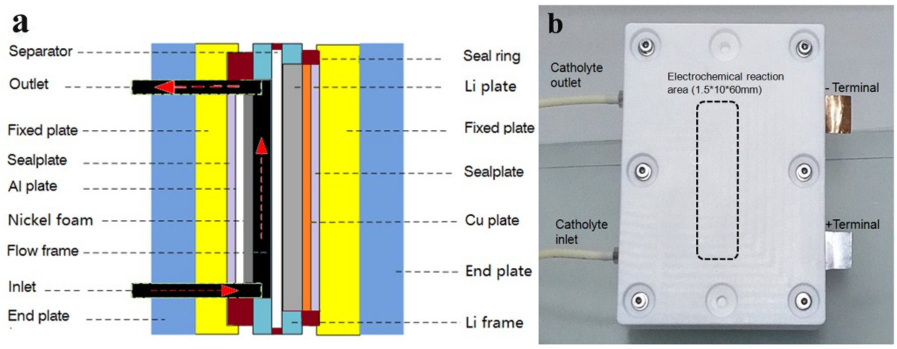

Fig. S1 (a) Schematic illustration of the flow cell configuration. (b) Photograph of the flow cell with electrochemical area of 1.5 × 10 × 60 mm.

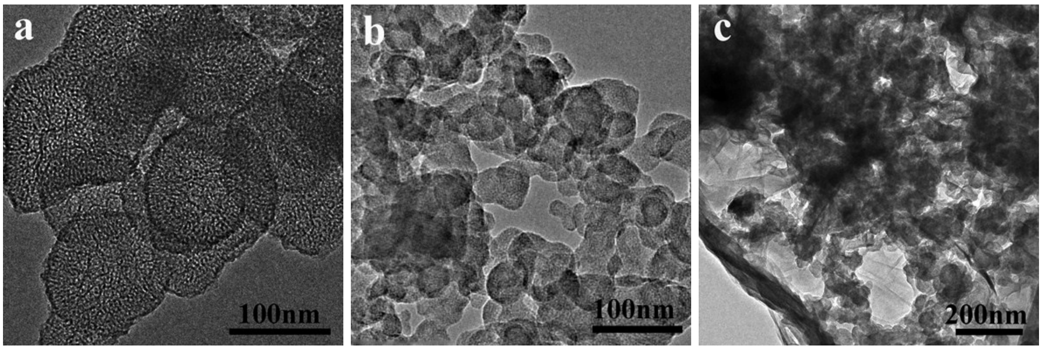

Fig. S2 TEM of (a) KB, (b) S-KB and (c) S-KB@rGO

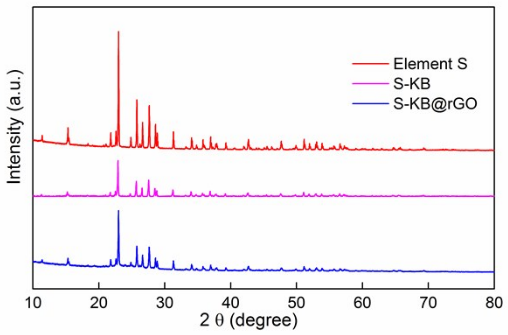

Fig. S3 X-ray diffraction patterns of sulfur, S-KB and S-KB@rGO

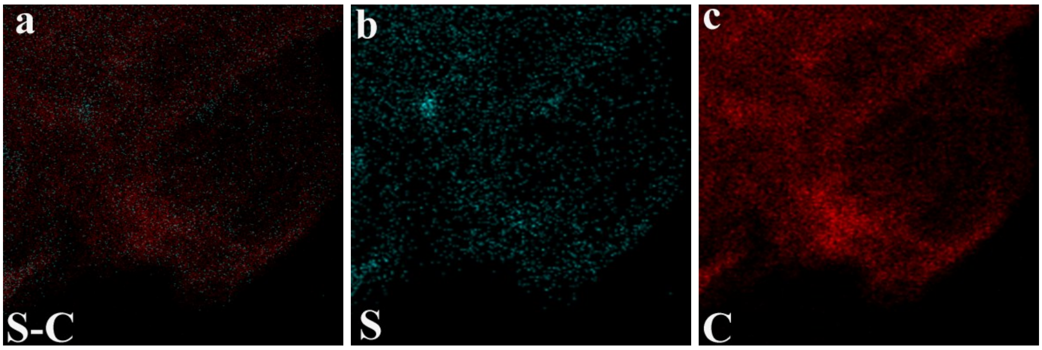

Fig. S4 The elemental maps of (a) carbon and sulfur, (b) sulfur and (c) carbon in the S-KB@rGO composite.

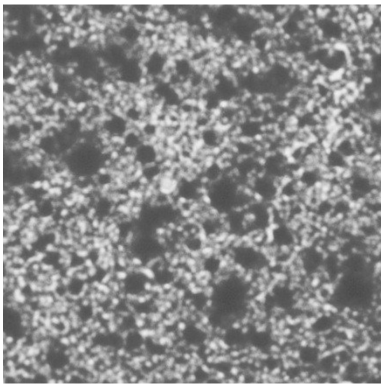

Fig. S5 Photograph of the suspension catholyte magnified by 200 times, a continuous 3D conduction network is formed in the suspension.

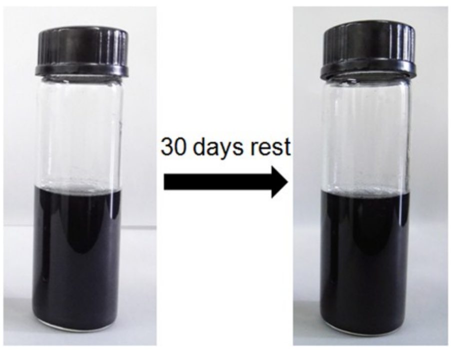

Fig. S6 Photographs of the catholyte with 198 g L^{-1} S-KB@rGO, it can keeps homogeneous after 30-day rest.

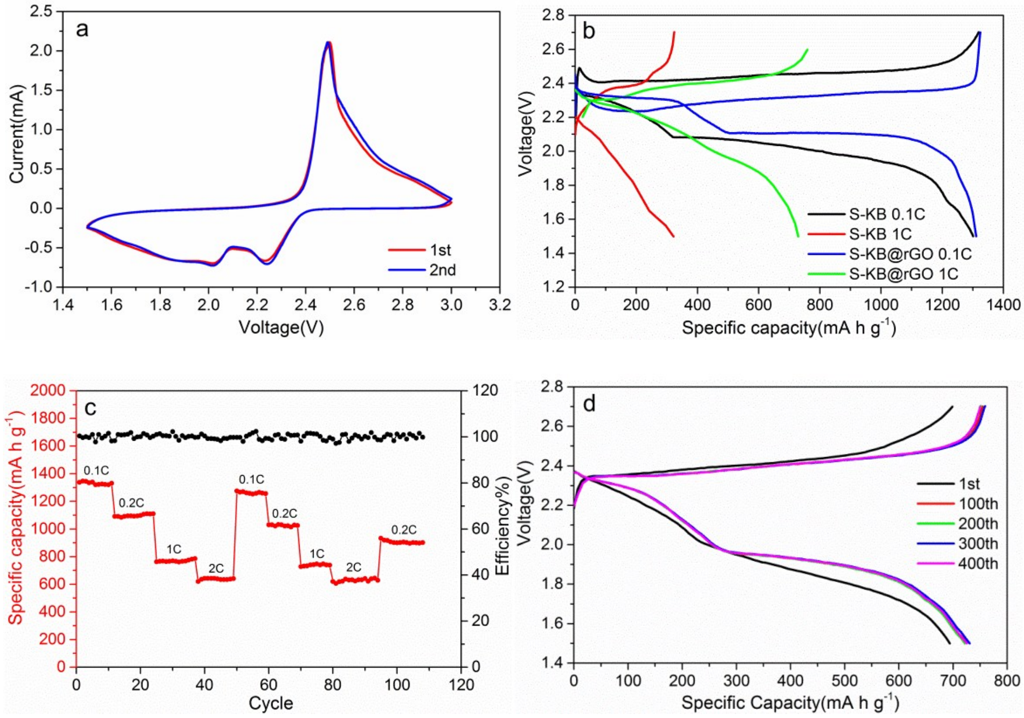

Fig. S7 (a) CV profiles of S-KB@rGO suspension catholyte at a scan rate of 0.1mVs^{-1} in the voltage range of 1.5 - 3 V vs. Li/Li^{+}. (b) Charge/discharge profiles of the KB and S-KB@rGO catholyte at varied rates, the S-KB@rGO suspension shows much better rate performance. (c) Rate capability of the S-KB@rGO catholyte. (d) Charge/discharge profiles extracted from 1C cycling test.

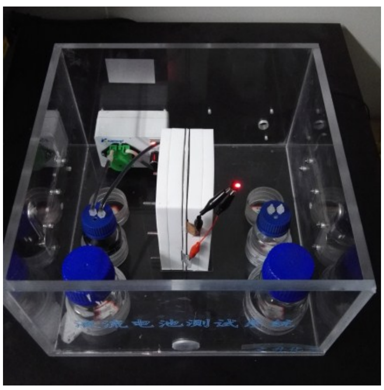

Fig. S8 Photograph of the S-KB@rGO suspension flow battery system.

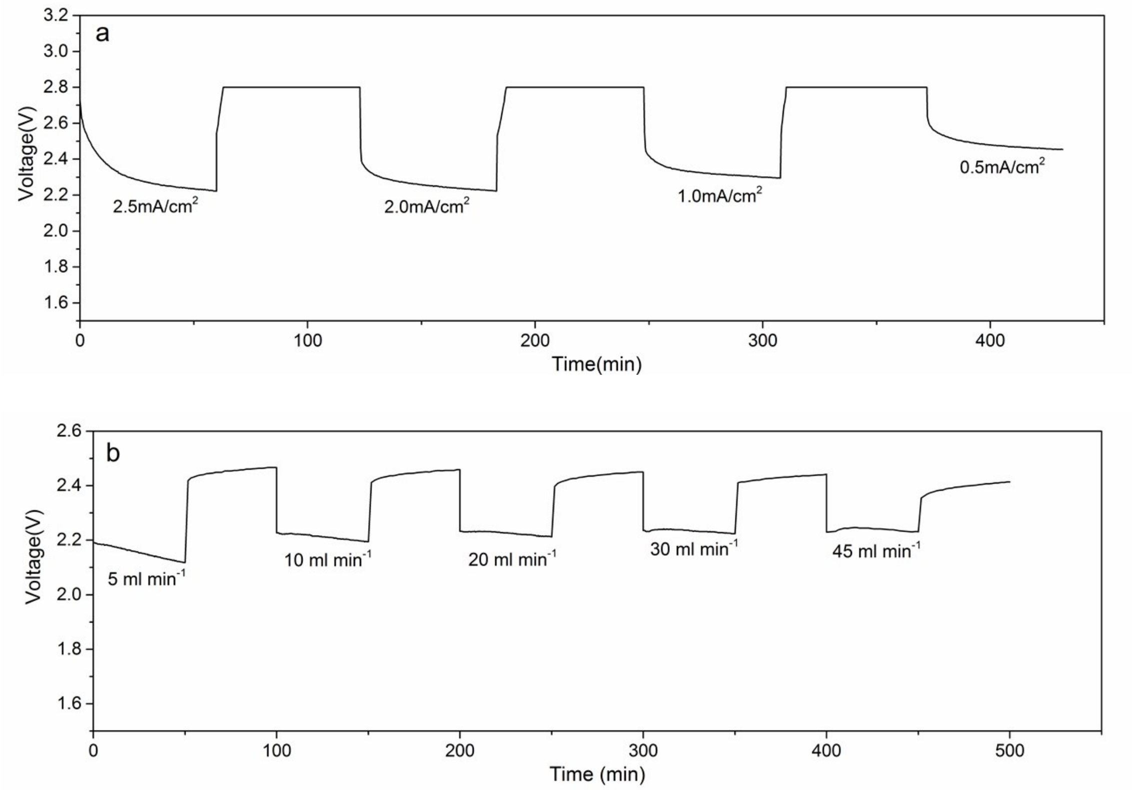

Fig. S9 Charge/discharge profiles at varied (a) current density and (b) flow rate in continuous flow mode.

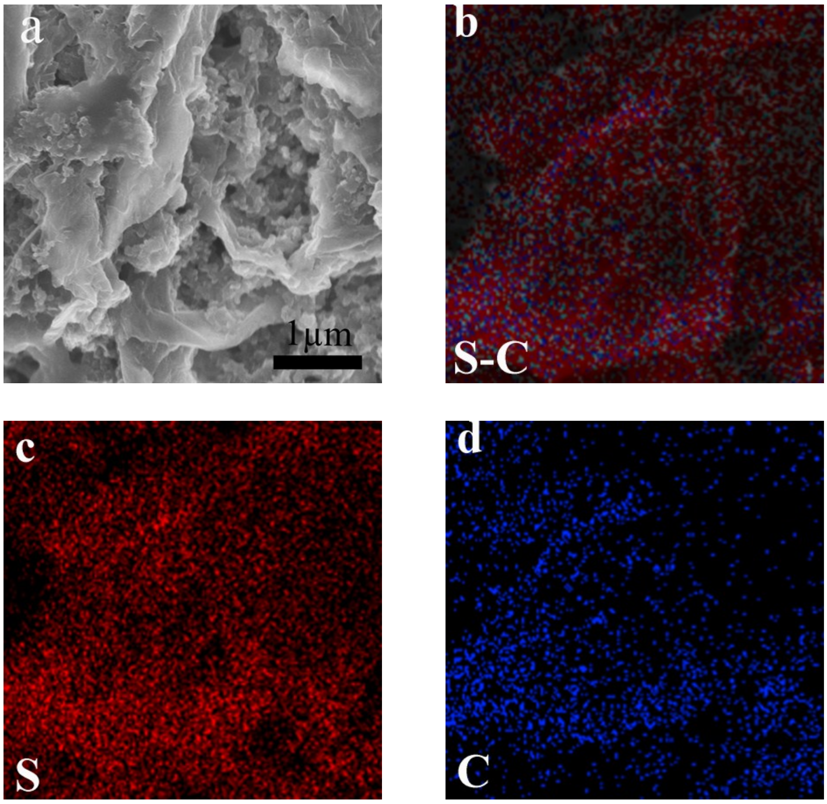

Fig. S10. (a) SEM of S-KB@rGO composite after cycling. Elemental maps of (b) carbon and sulfur ,(c) sulfur and (d) carbon in the S-KB@rGO composite after cycling.