Electronic Supplementary Material (ESI) for Dalton Transactions.

Multifunctional $NiCo_2O_4$ Nanosheet Assembled Hollow Nanoflower as a Highly Efficient Sulfur Host for Lithium-Sulfur Batteries

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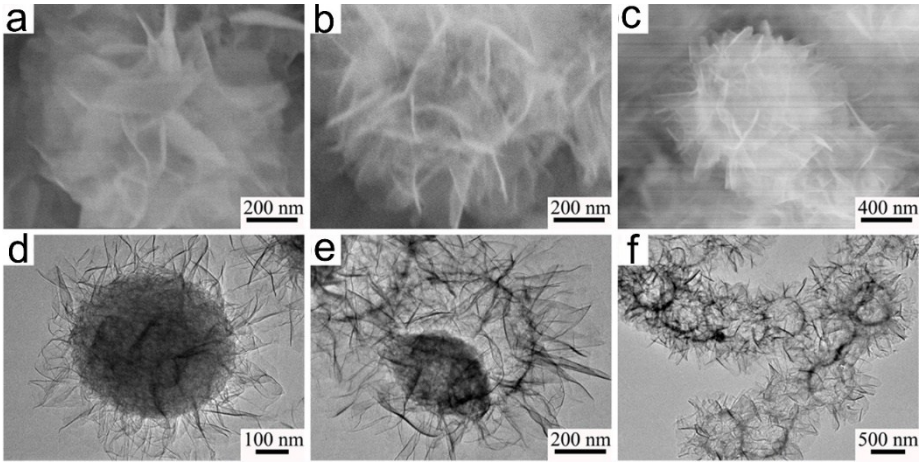

Fig. S1. (a-f) SEM morphologies of the precursor of NCOHF taken after reaction for: (a, d) 0.5 h, (b, e) 1 h, (c, f) 3 h, respectively.

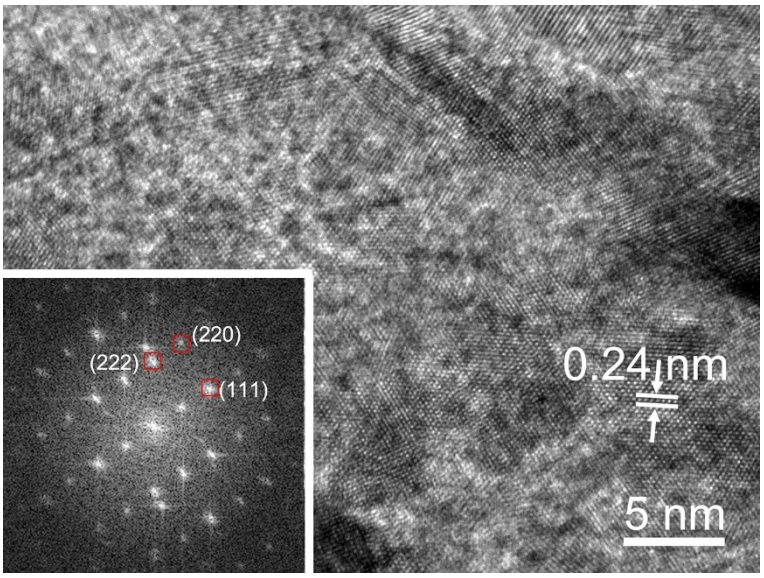

Fig. S2. HRTEM images of NCOHF and the related FFT patterns.

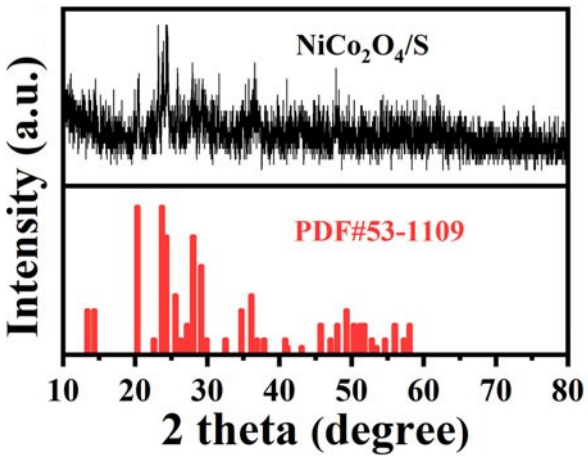

Fig. S3. XRD patterns of NCOHF/S composite structures (upper panel) and raw sulfur (lower panel).

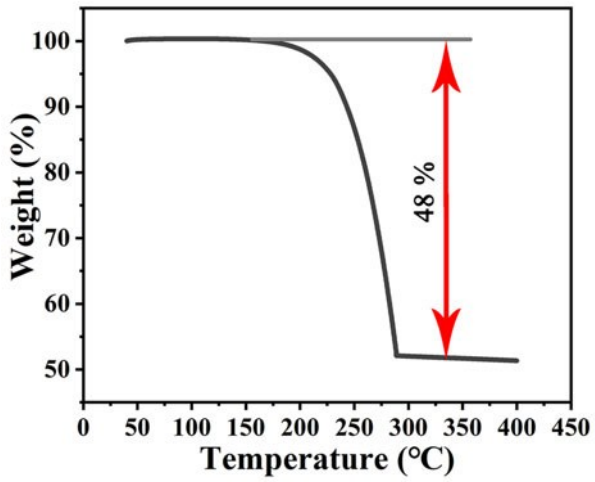

Fig. S4. Thermogravimetric curve of curves in air of the NCOHF/S composite.

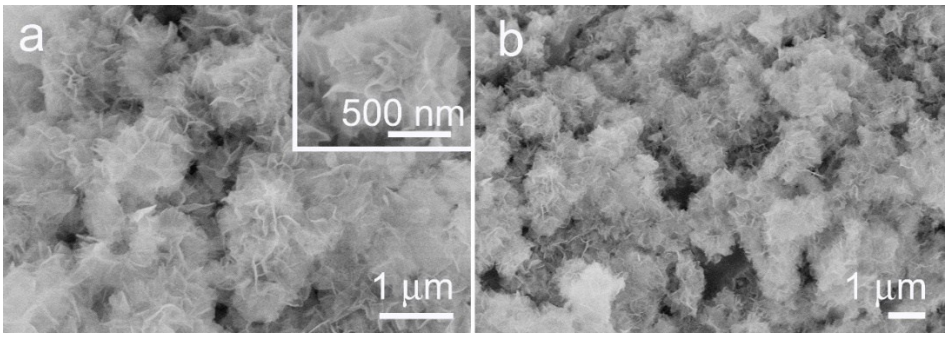

Fig. S5. (a) SEM image of Co_3O_4 hollow nanoflowers (COHF). (b) SEM image of COHF/S composite.

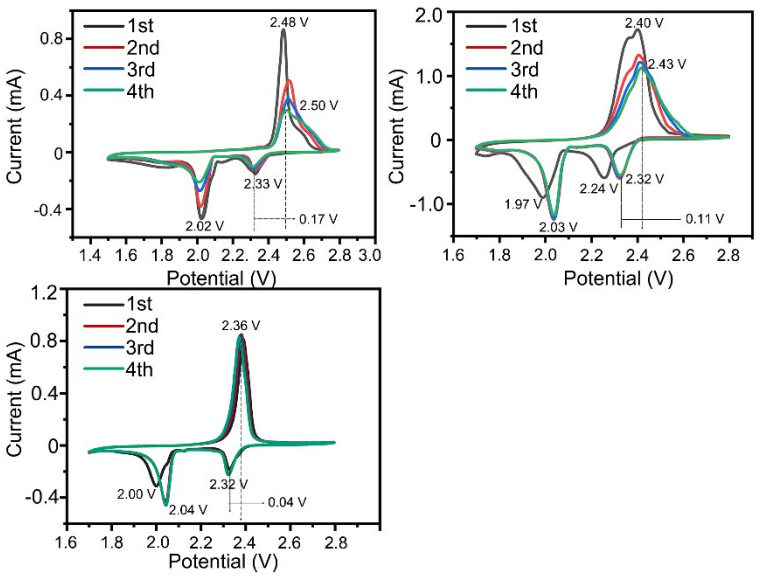

Fig. S6. CV profiles of S (a), COHF/S composite (b) and NCOHF/S composite (c) electrodes between the cut-off voltage of 1.7 V and 2.8 V.

Table 1 The electrochemical performance of other cathode materials in LSBs.

Materials	Rate performance	Cycle performance	References
NiO-$NiCo_2O_4$@PPy hollow polyhedron	310 mAh/g@2C	411 mAh/g@1C, 200 cycles	1
Ni-Co oxide hollow microspheres	220 mAh/g@4C	730 mAh/g@0.3C, 140 cycles	2
$NiCo_2O_4$@CNT/S Composites	575 mAh/g@2C	812 mAh/g@0.2C, 100 cycles	3
MnO_2@Carbon Hollow Nanoboxes	300 mAh/g@1.5A/g	~200 mAh/g@2A/g, 200 cycles	4
hollow carbon nanosphere@TiN nanopartice	450 mAh/g@2C	812.6mAh/g0.1C, 200 cycles	5
$NiCo_2O_4$ nanofibers	400 mAh/g@5C	872mAh/g@0.5C, 100 cycles	6
$NiCo_2O_4$ hollow nanoflowers	432.2 mAh/g@2C	610.4mAh/g@0.5C, 100 cycles	**This work**

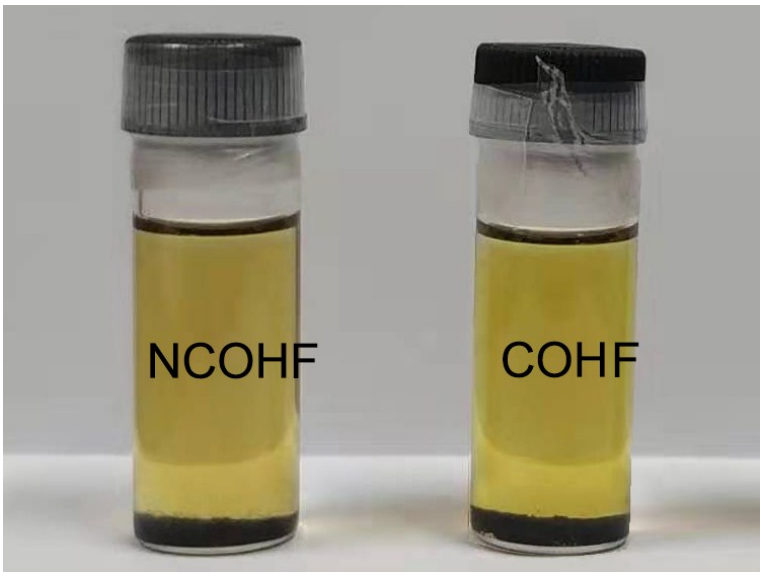

Fig. S7. The LiPSs adsorption ability experiment of NCOHF and COHF: the digital graph of NCOHF and COHF in LiPSs solution in the beginning.

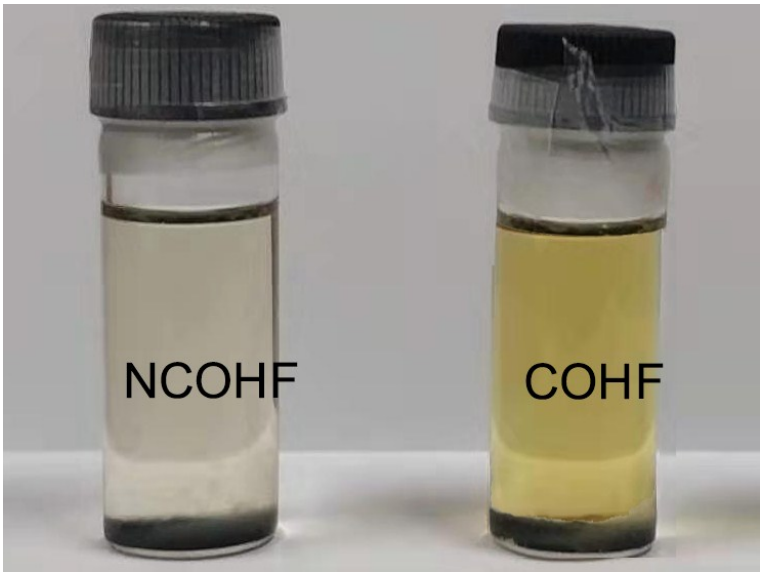

Fig. S8. The LiPSs adsorption ability experiment of NCOHF and COHF: the digital graph of NCOHF and COHF in LiPSs solution after 4 hours.

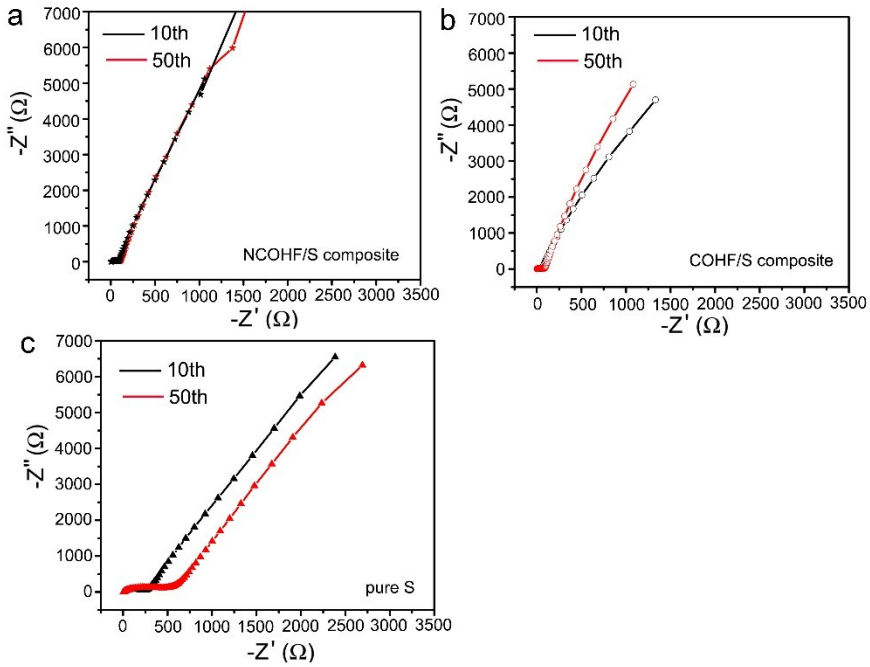

Fig. S9. Nyquist plots for NCOHF/S (a), COHF/S (b) and S electrodes (c) after 10th and 50th cycle.

Reference

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