Electronic Supplementary Information for

Carbon encapsulated hybrid Fe-based nanorods with durable lithium storage

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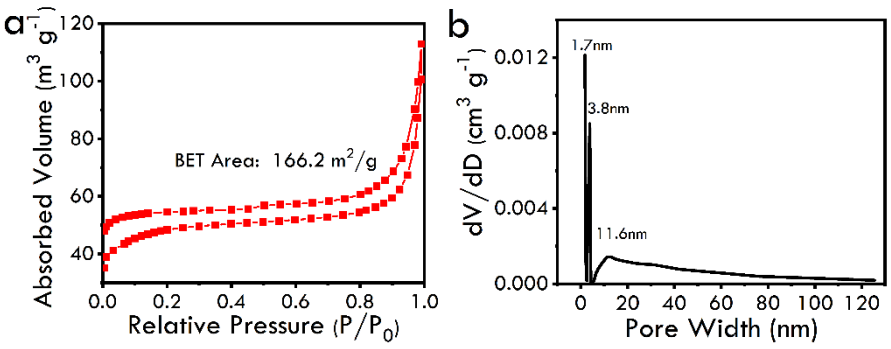

Fig. S1 (a) Nitrogen adsorption and desorption isotherms of Fe_3O_4@NC. (b) The corresponding pore-size distributions calculated through BJH method from adsorption branch.

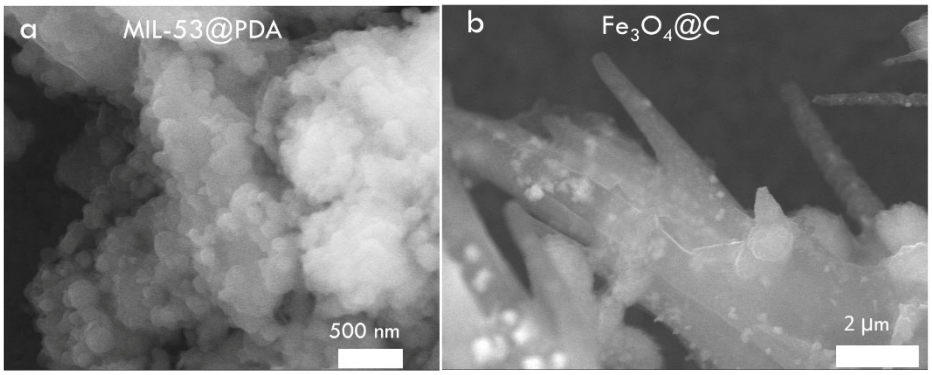

Fig. S2 The SEM images of MIL- 53@PDA (a), Fe_3O_4@C (b).

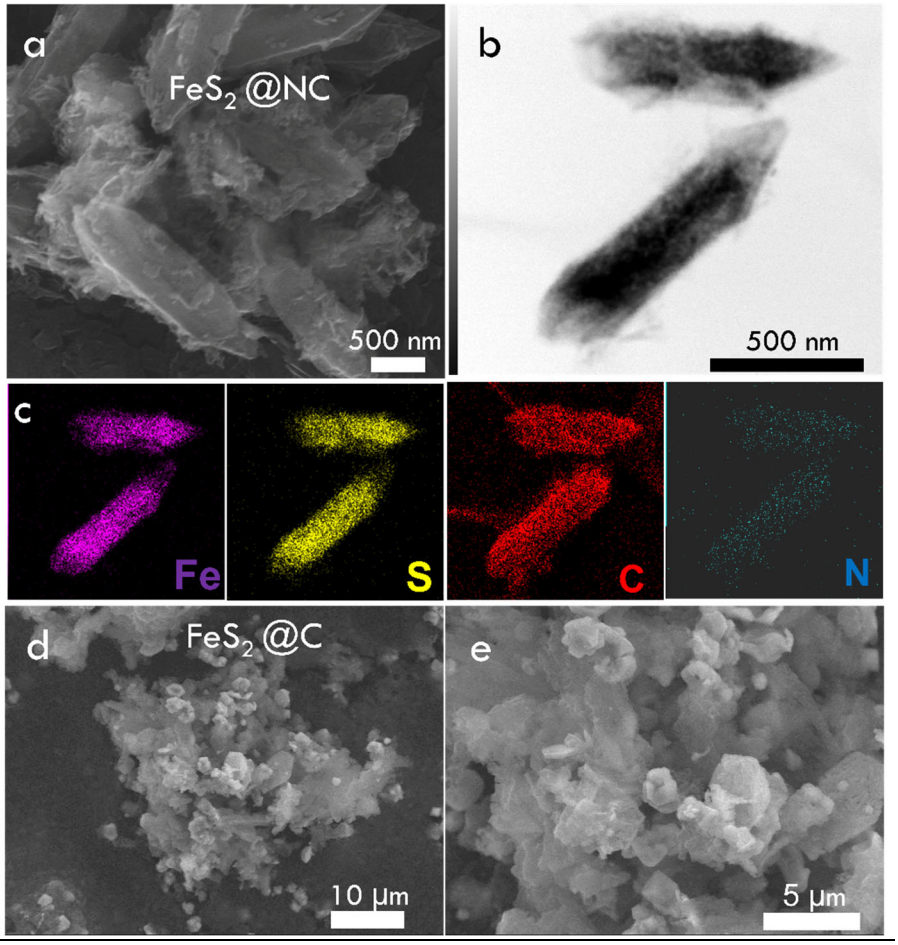

Fig. S3 (a, b) SEM andTEM images of FeS_2@NC, (c) Mapping of the FeS_2@NC, (d, e) SEM images of FeS_2@C.

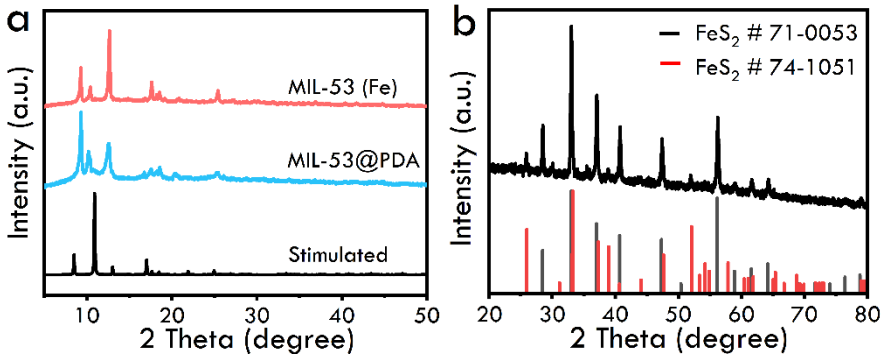

Fig. S4 XRD patterns of MIL-53 (Fe) (a), FeS_2@NC (b).

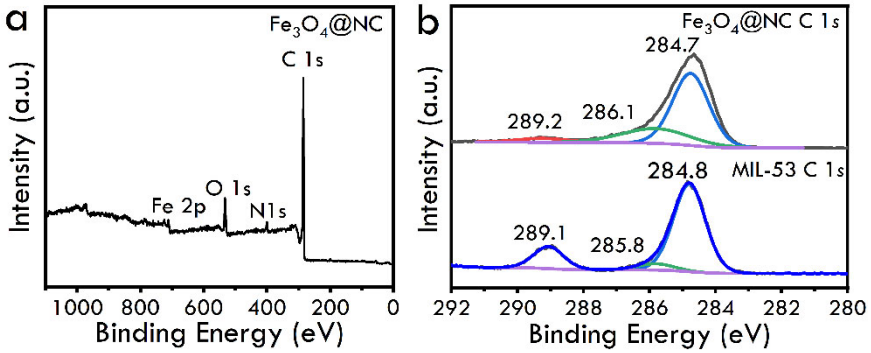

Fig. S5 XPS spectra of Fe_3O_4@NC (a), C 1s (b) of the Fe_3O_4@NC and MIL-53 (Fe).

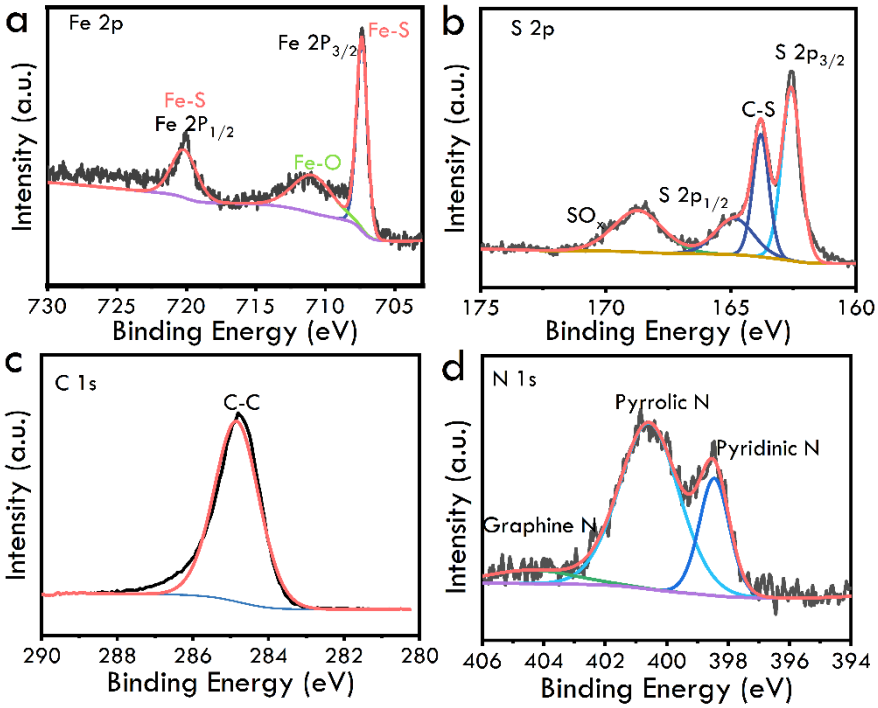

Fig. S6 XPS spectra of FeS_2@NC.

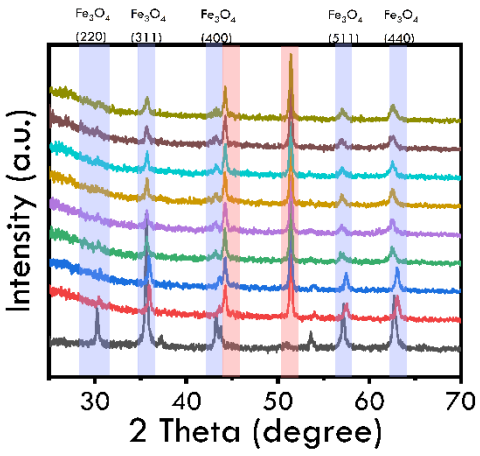

Fig. S7 In situ XRD of Fe_3O_4@NC during the initial lithiation. The red constant peaks are the shell of

the coin battery. The black line is the electrode and the red line is the XRD of the unrun battery.

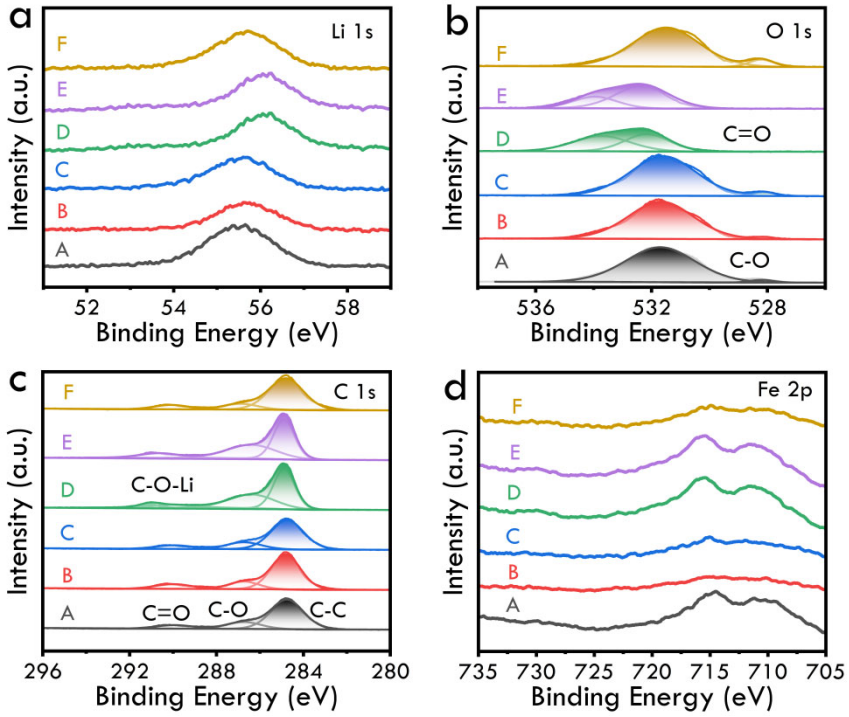

Fig. S8 XPS spectra of Li 1s (a), O 1s (b), C 1s (c) and Fe 2p (d) of Fe_3O_4@NC. (A: the initial of the 1nd cycling; B: discharged to 1.02 V; C: discharged to 0.86 V; D: charged to 1.63 V; E: charged to 1.89 V; F: charged to 3 V)

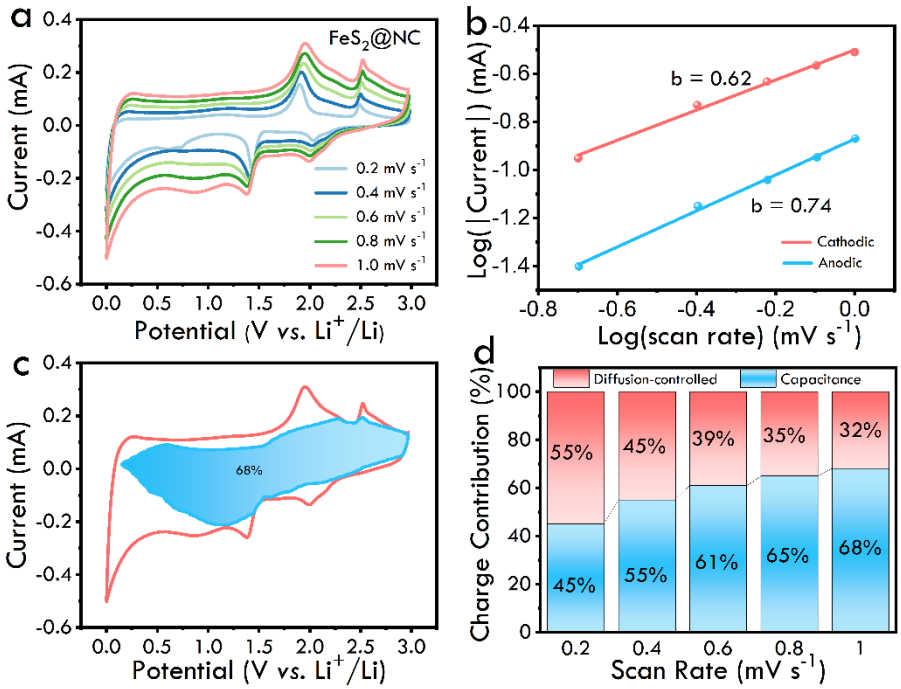

Fig. S9 (a) CV curves of FeS_2@NC electrode at different scanning speed. (b) Oxidation and reduction current peak diagrams with sweep rate of 0.2-1 mV s^{-1}. (c) CV curve of capacitance current (middle blue part) and total current at 1 mV s^{-1} scanning speed. (d) Dependence of capacitance contribution of different scan rates.

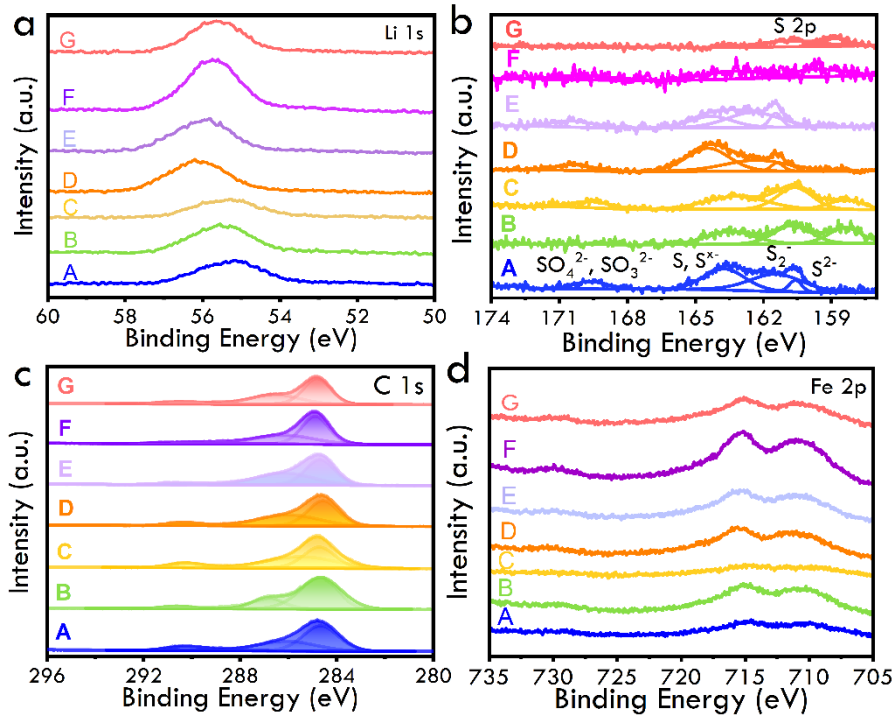

Fig. S10 ex situ XPS spectra of Li 1s (a), S 2p (b), C 1s (c) and Fe 2p (d). (A: the initial of the 1nd cycling; B: discharged to 2.12 V; C: discharged to 1.52 V; D: charged to 0.95 V; E: charged to 1.84 V; F: charged to 2.43 V; G: charged to 3 V)

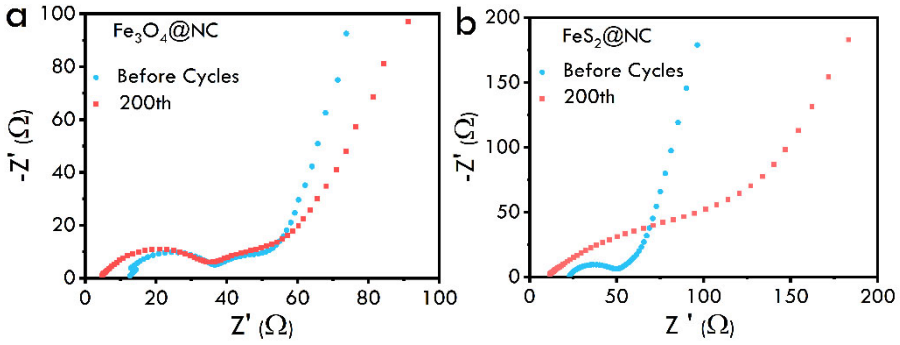

Fig. S11 EIS analysis of Fe_3O_4@NC (a) and FeS_2@NC (b) before and after 200th cycles.