

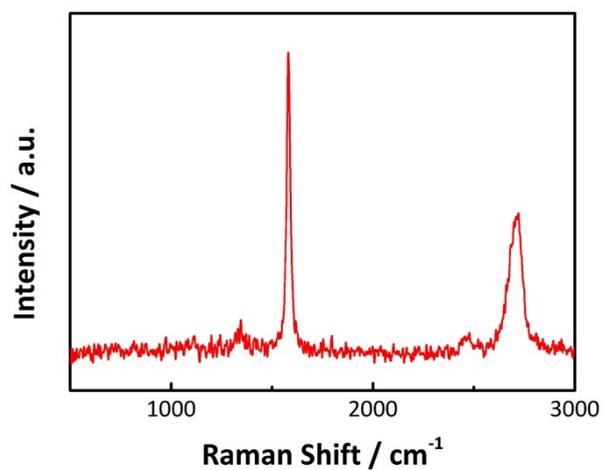
## Supporting Information

### **Achieving the stable Na metal anode with the 3D carbon fibre scaffold**

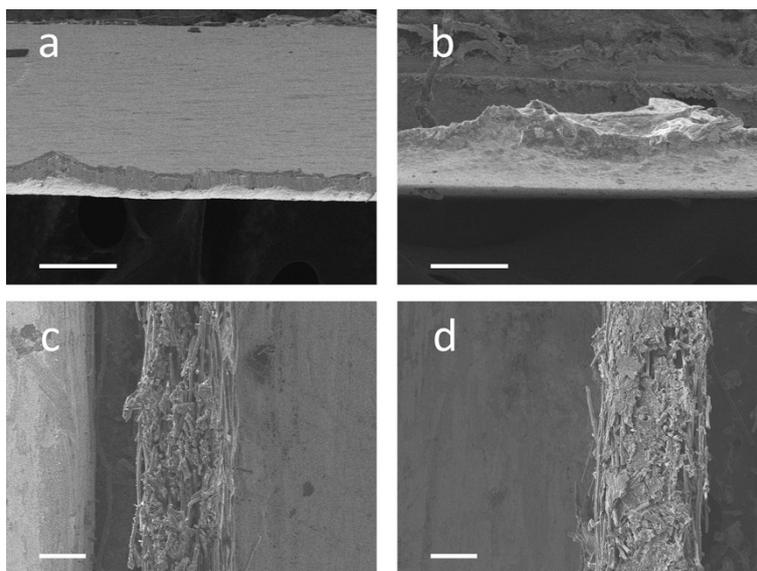
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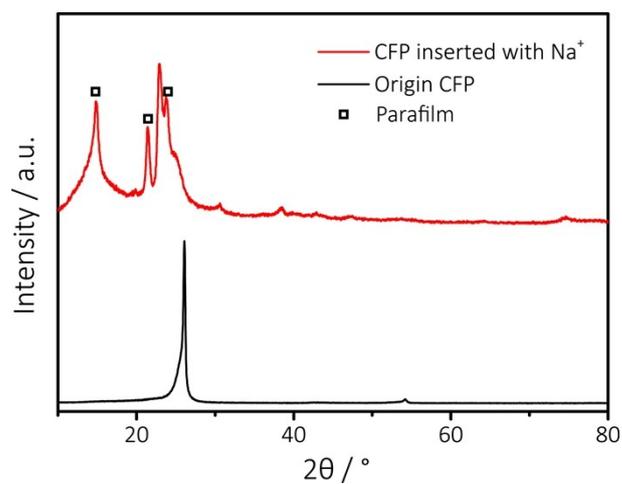
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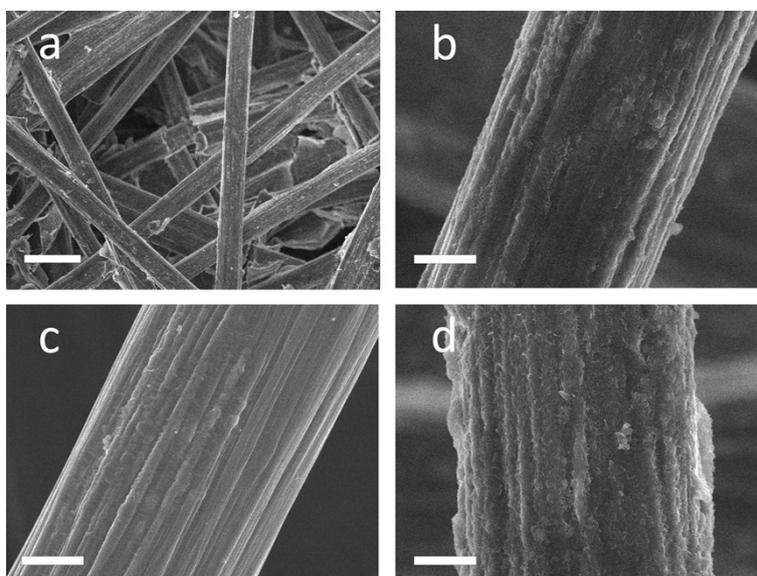
**Fig. S1** Raman spectrum profiles of CFP.



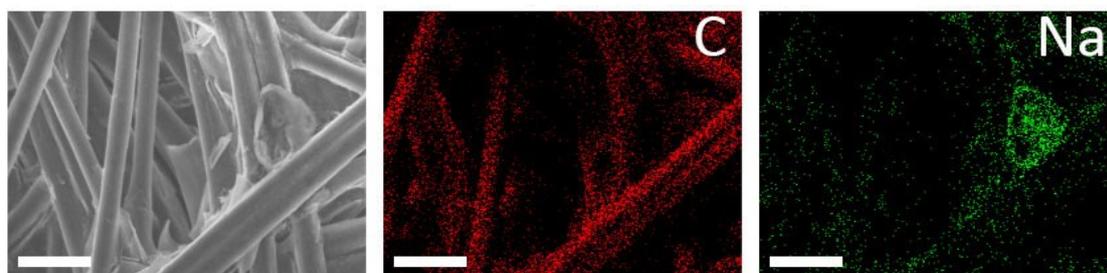
**Fig. S2** Cross-sectional SEM images of (a) origin Cu foil, (b) Cu electrode with 1mAh cm<sup>-2</sup> deposited Na, (c) origin CFP, (d) CFP electrode with 1 mAh cm<sup>-2</sup>. The scale bars are 50  $\mu$ m (a, b) and 100  $\mu$ m (c, d), respectively.



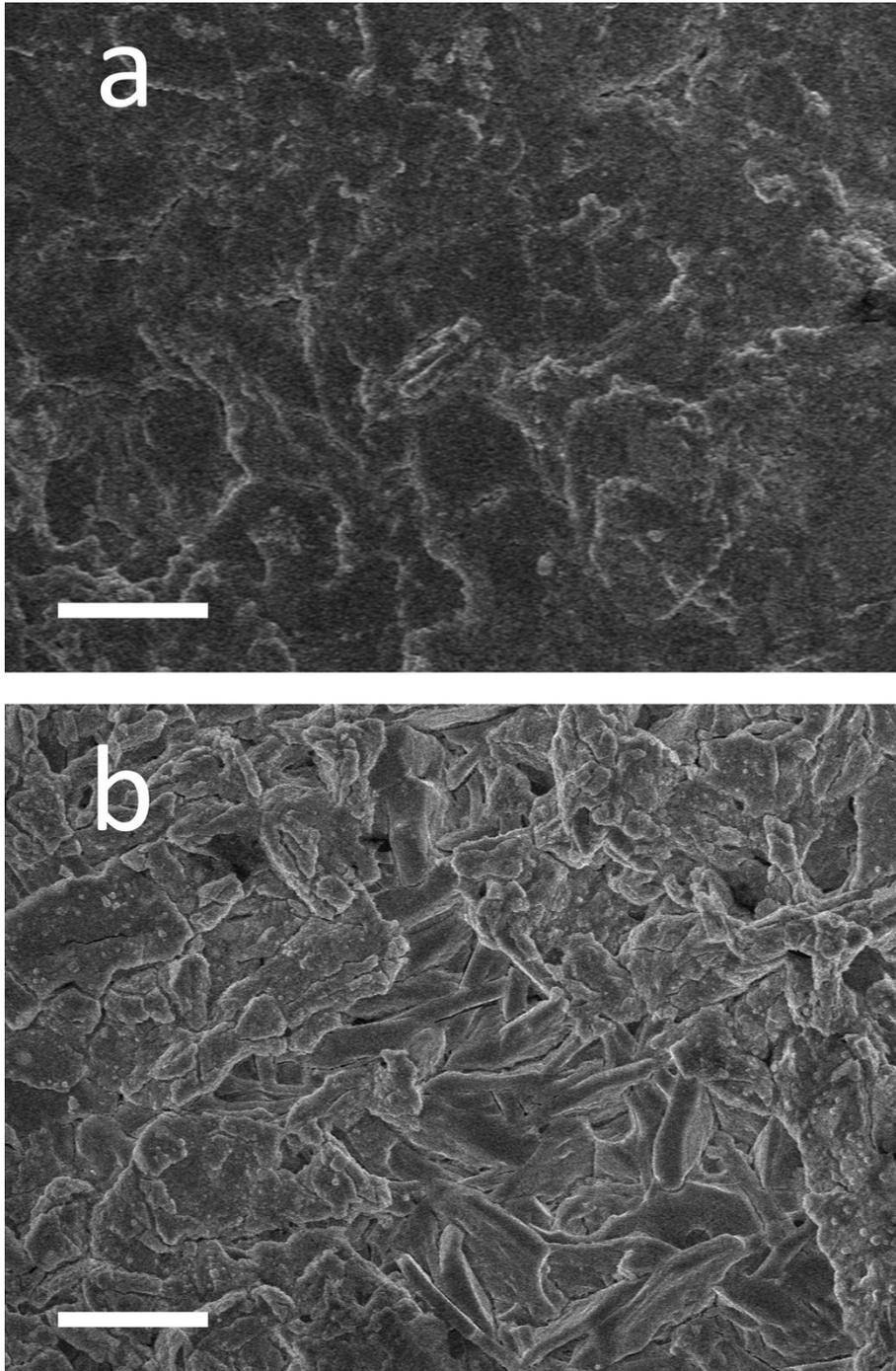
**Fig. S3** XRD profiles of CFP inserted with  $\text{Na}^+$  and origin CFP.



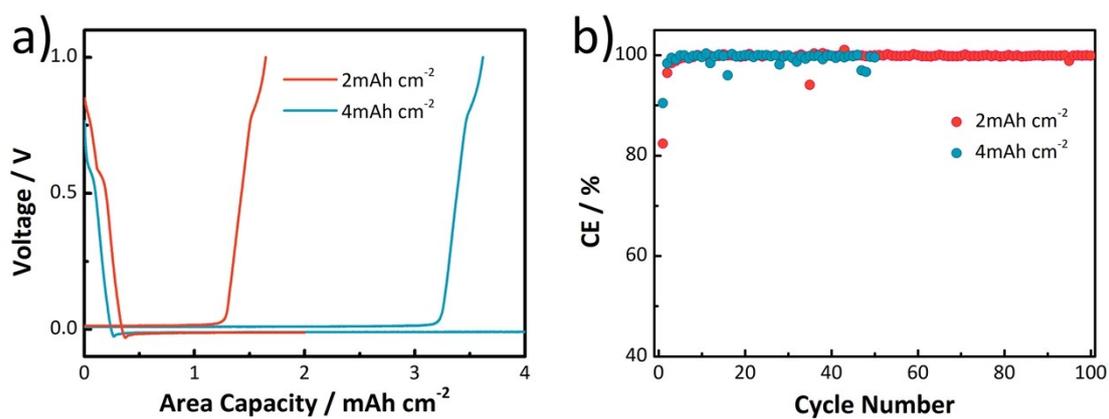
**Fig. S4** SEM images of CFP with  $\text{Na}^+$  insertion in 1st cycle under (a) low and (b) high magnification. SEM images under high magnification of (c) origin CFP and (d) CFP after Na stripping in 30th cycle. The scale bars are  $20\ \mu\text{m}$  (a) and  $2\ \mu\text{m}$  (b, c, d), respectively.



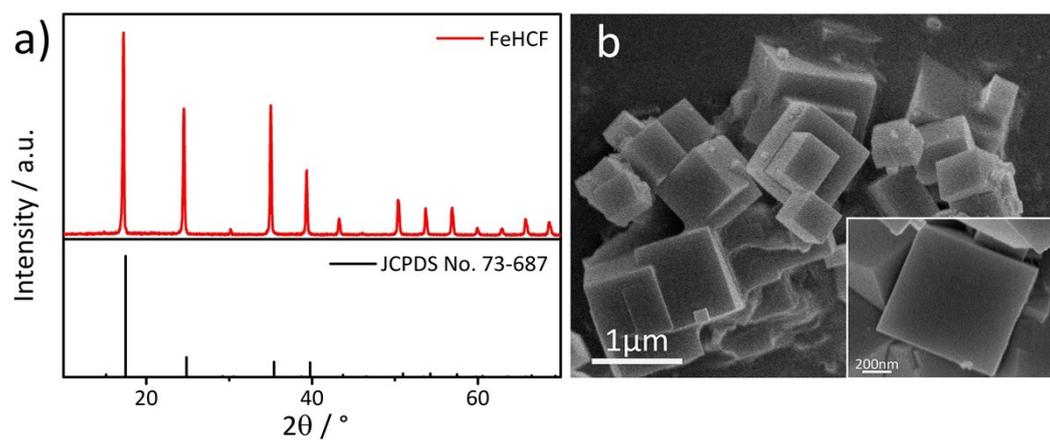
**Fig. S5** SEM elemental mappings of the CFP electrode with  $0.2\ \text{mAh cm}^{-2}$  deposited Na after  $\text{Na}^+$  insertion. The scale bar is  $25\ \mu\text{m}$ .



**Fig. S6** The SEM images of morphologies of deposited Na on CFP (a) and Cu (b) electrodes under high magnification. The scale bars are 10  $\mu\text{m}$ .



**Fig. S7** (a) The voltage profiles of Na depositing/stripping with 2 mAh cm<sup>-2</sup> and 4mAh cm<sup>-2</sup> for the first cycle, (b) The Coulombic efficiency of CFP half-cells with different capacities.



**Fig. S8** (a) XRD and (b) SEM images of obtained FeHCF.