

Nanocavity-engineered Si/multi-functional carbon nanofiber composite anodes

with exceptional high-rate capacities

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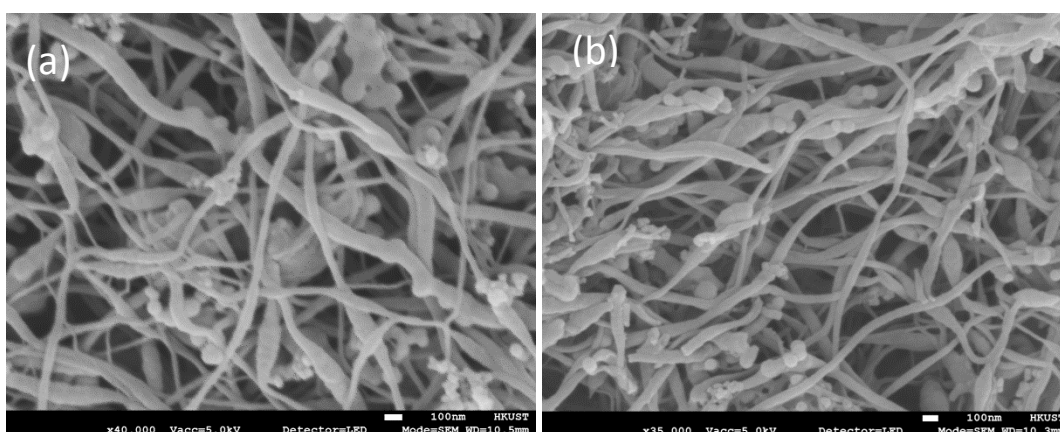


Fig. S1 SEM images of (a) Si/Fe/CNF and (b) C-Si/F-CNF.

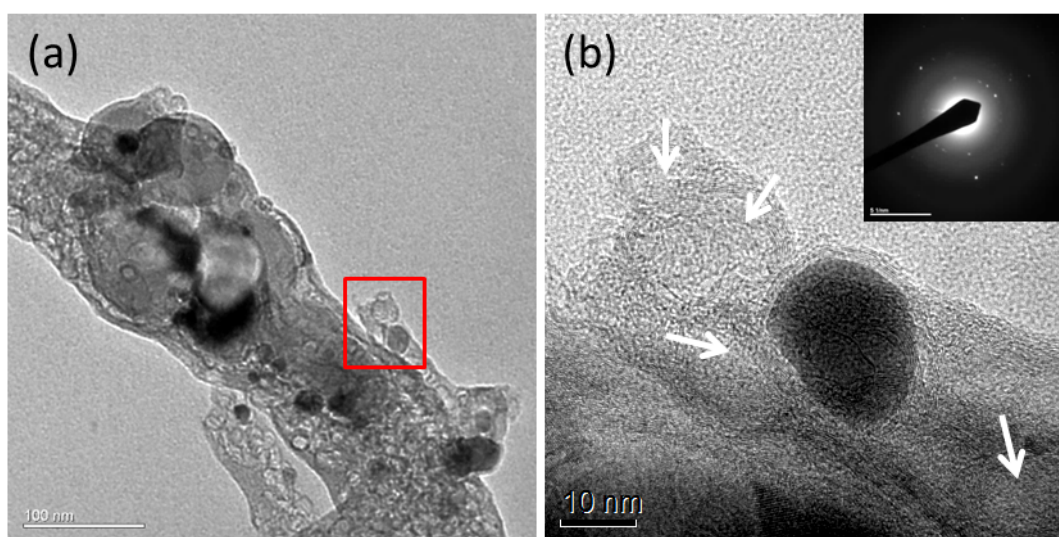


Fig. S2 HRTEM images of Si/Fe/CNF: white arrows in (b) present mesopores formed around Fe₃C particles and the inset SAED image corresponds to Fe₃C.

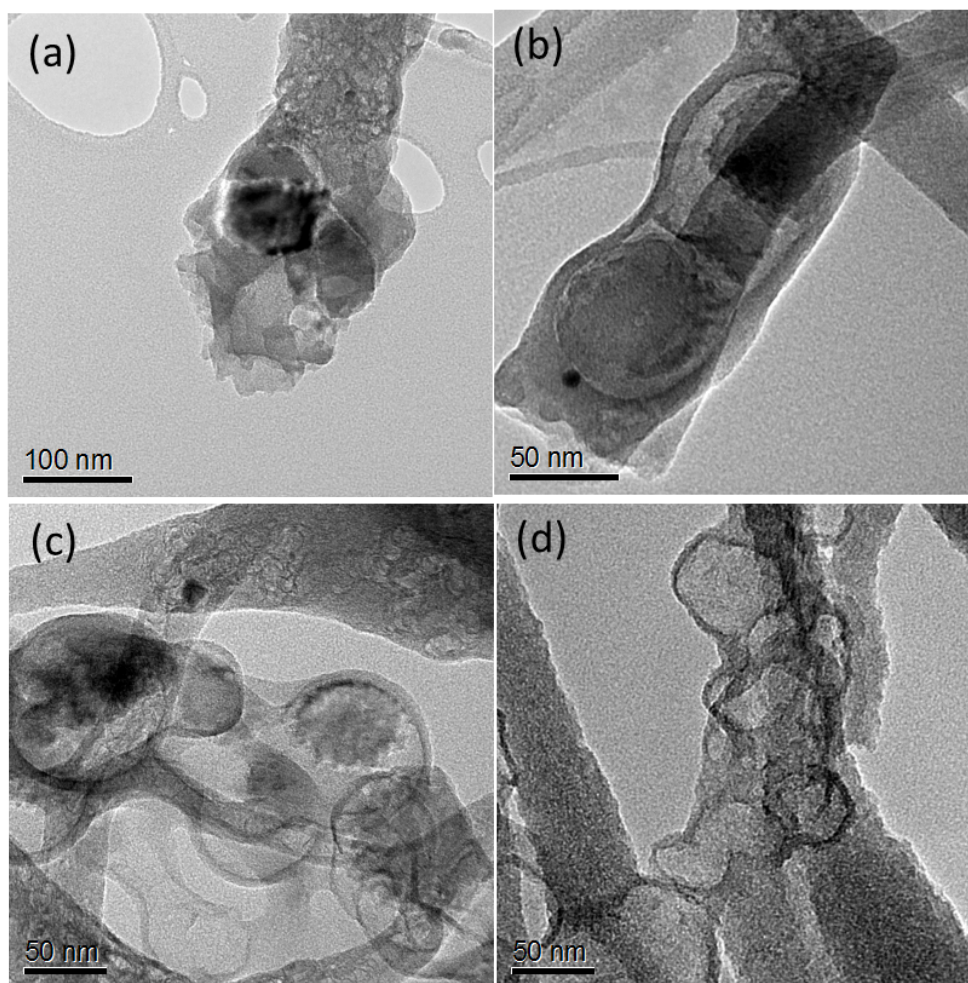


Fig. S3 TEM images of C-Si/F-CNF after etching different durations of (a) 15; (b) 30; (c) 45; and (d) 60 min.

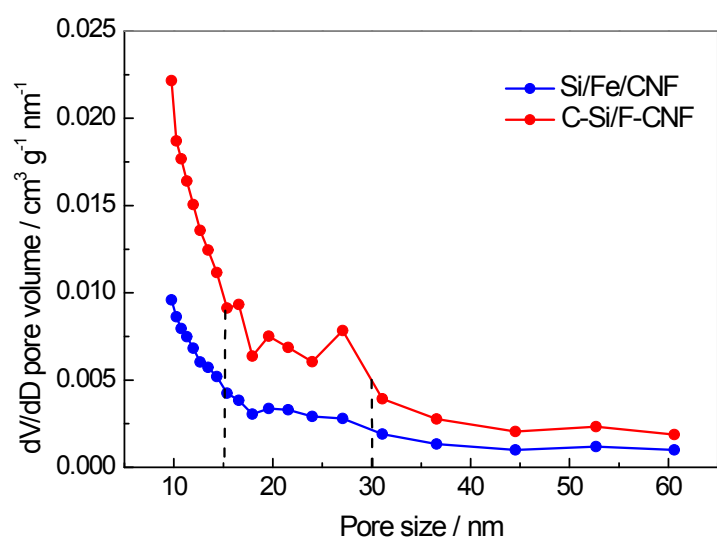


Fig. S4 BJH pore size distributions ranging from 10 to 60 nm of Si/Fe/CNF and C-Si/F-CNF.

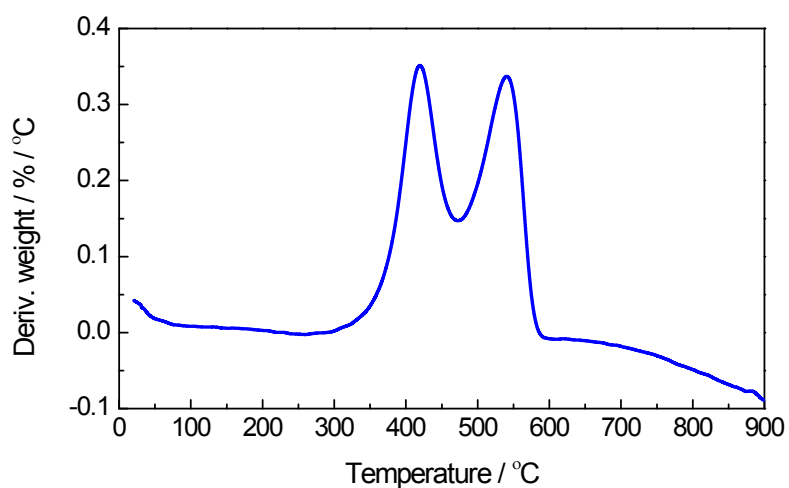


Fig. S5 Differential thermal analysis (DTA) curve of Si/Fe/CNF.

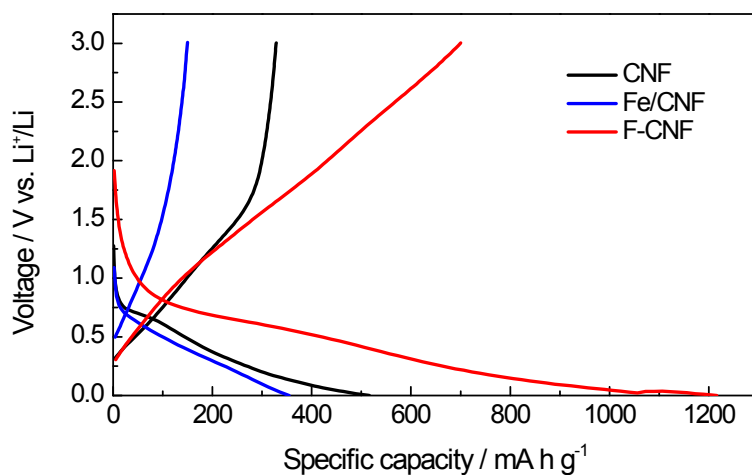


Fig. S6 Initial charge/discharge profiles of CNF, Fe/CNF and F-CNF at 0.5 A g^{-1} . The electrochemically inert Fe_3C in Fe/CNF significantly decreased the capacity of CNF, while the functionalized CNF (F-CNF) delivered a much higher original capacity than that of CNF due to the additional Li ion sites.²⁵

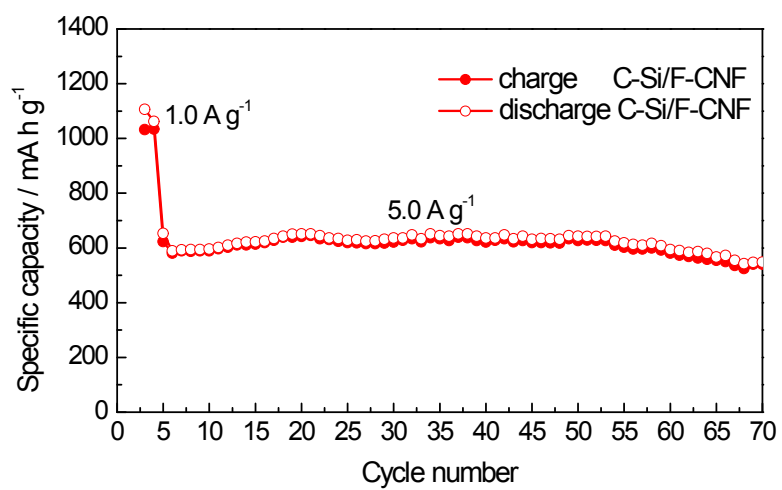


Fig. S7 High rate capacities of C-Si/F-CNF electrode measured at 5.0 A g⁻¹ for 70 cycles.