Polyvinylidene fluoride derived-carbon confined microcrystalline graphite with improved cycling life and rate performance for potassium-ion batteries

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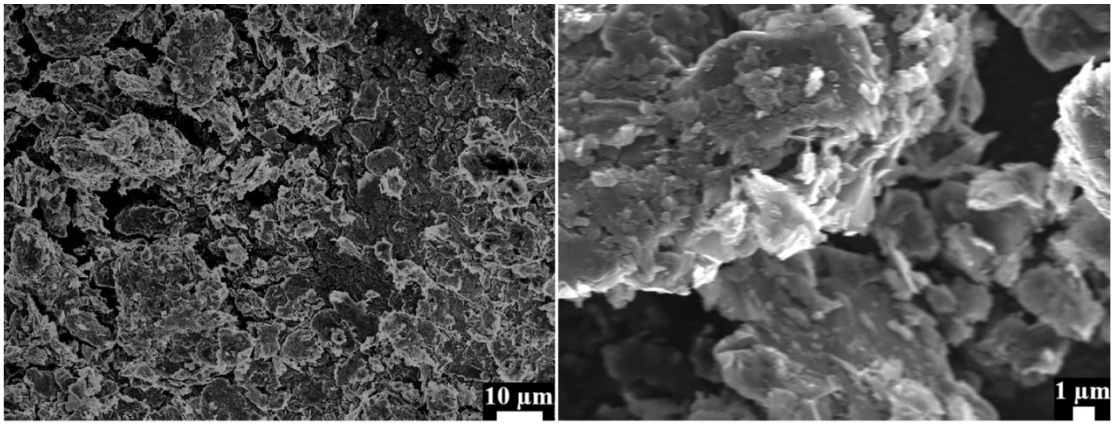

Fig. S1 SEM images of the pristine NMG.

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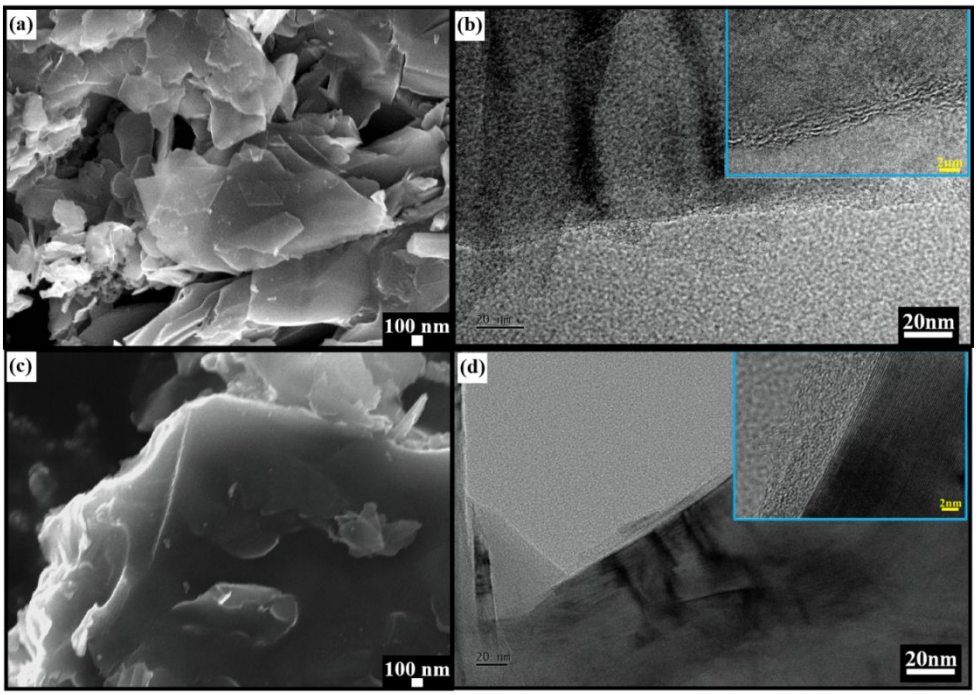

Fig. S2 (a) SEM and (b) TEM images of FC@NMG-1. (c) and (d) SEM and TEM images of FC@NMG-5. The inset of (b) and (d) are the corresponding HRTEM images.

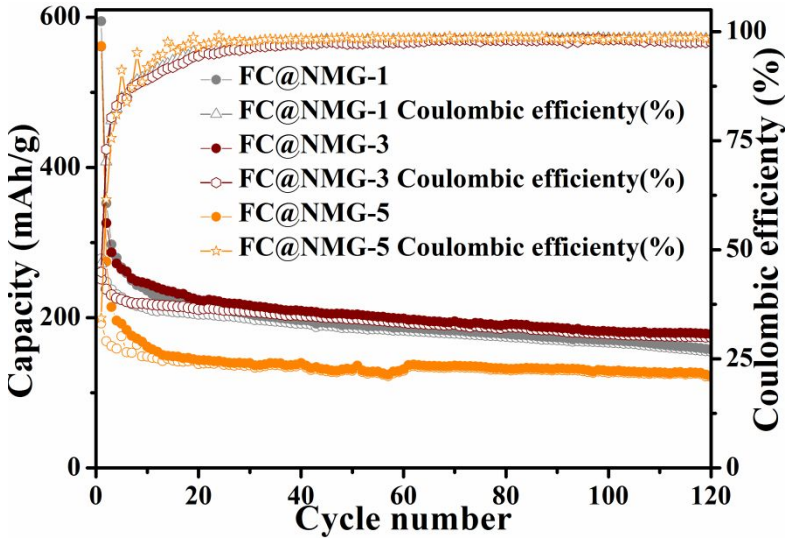

Fig. S3 Cycling performance comparison among FC@NMG-1, FC@NMG-3 and FC@NMG-5 at a current density of 0.1 A g^{-1}.

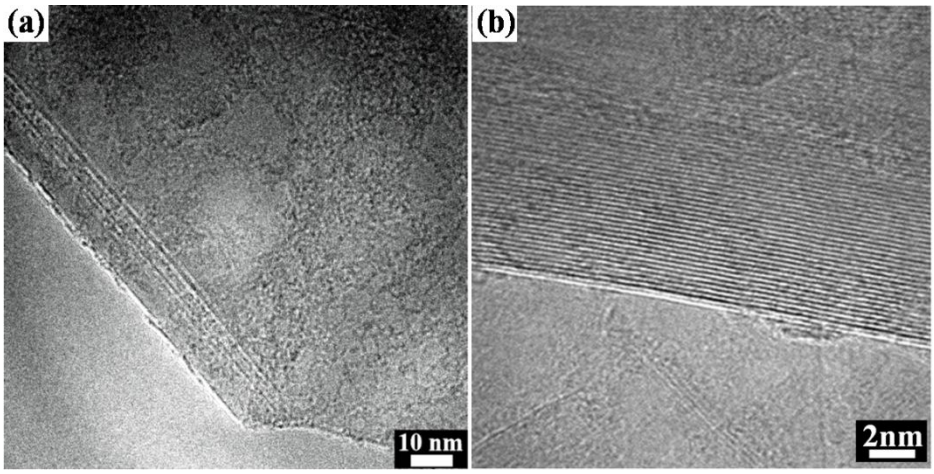

Fig. S4 Typical TEM image (a) and HRTEM image (b) of the pristine NMG.

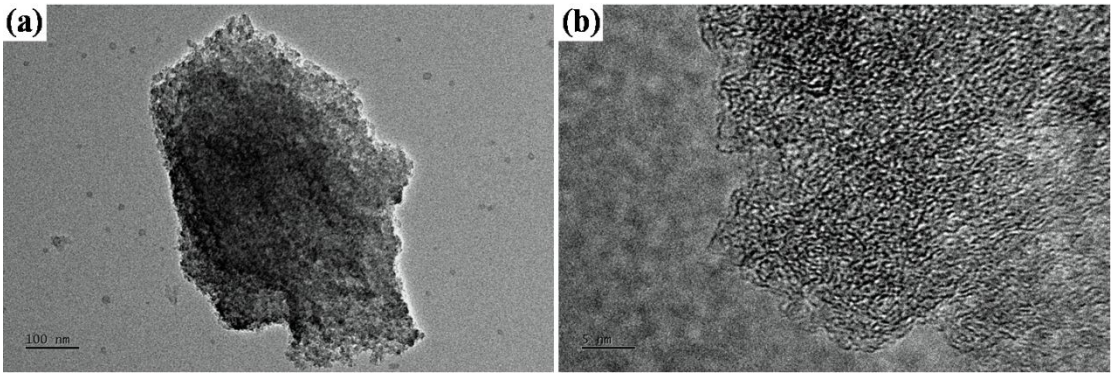

Fig. S5 (a) TEM and (b) HRTEM images of the pure FC.

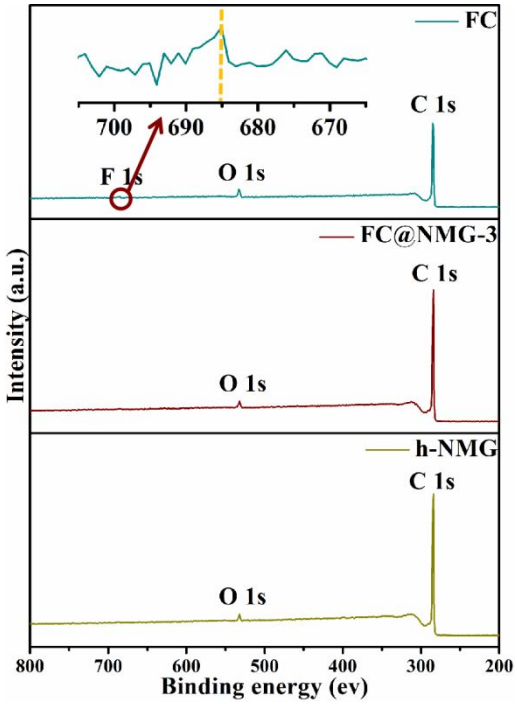

Fig. S6 XPS survey spectra of the FC@NMG-3 composite, h-NMG and FC, respectively.

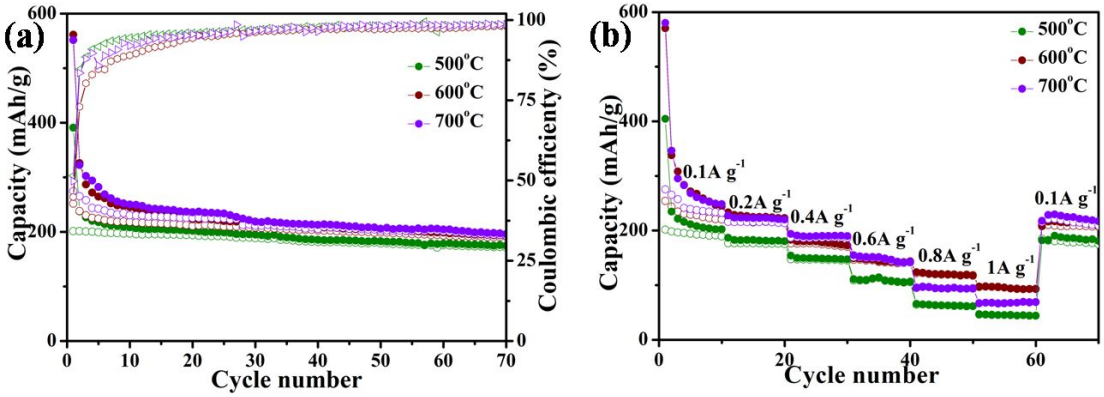

Fig. S7 (a) Cycling stability and (b) Rate performance of fluorine-doped NMG-3 composites with different annealing temperatures.

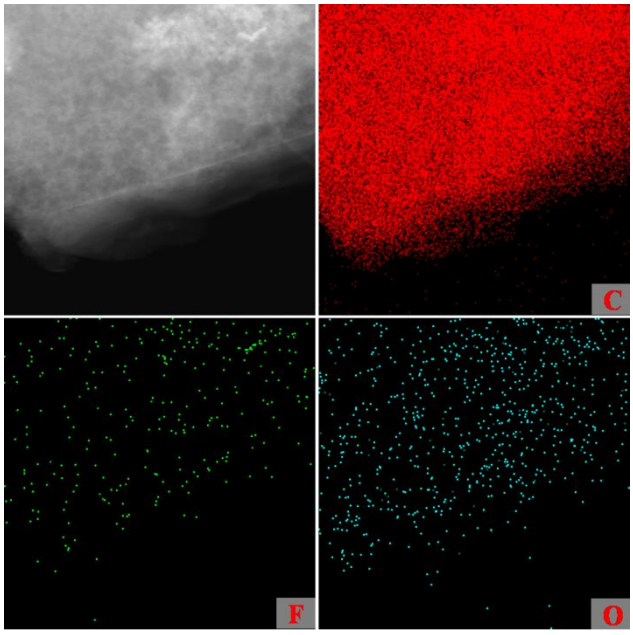

Fig. S8 TEM elemental mapping of C, F and O in the FC@NMG composite.

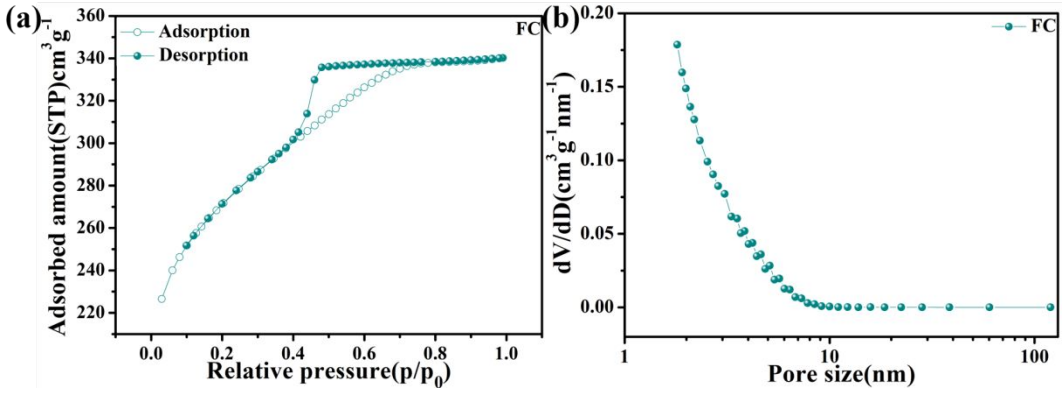

Fig. S9 (a) N_2 adsorption/desorption isotherms and (b) pore size distribution curves of FC.

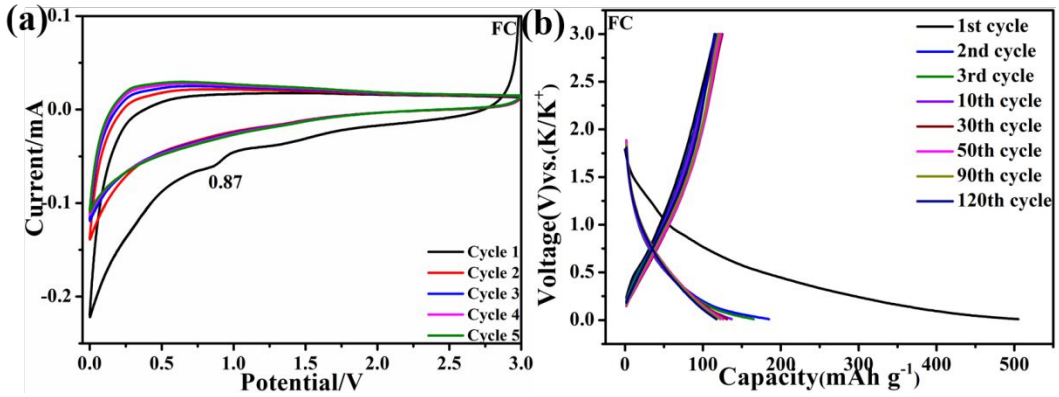

Fig. S10 (a) CV curves and (b) Galvanostatic discharge−charge profiles at a current density of 0.1 A g^{-1} for FC.

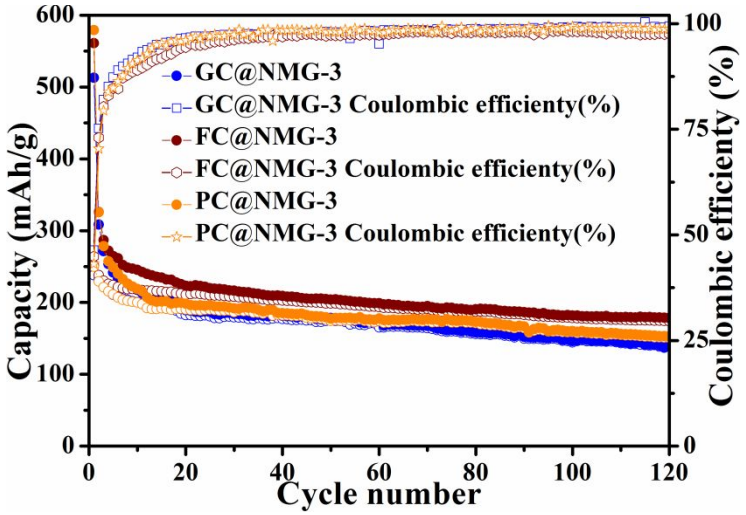

Fig. S11 Cycling performances at a current density of 0.1 A g^{-1} of FC@NMG-3, glucose derived carbon coated NMG (GC@NMG-3) and phenolic resin derived carbon coated NMG (PC@NMG-3), respectively.

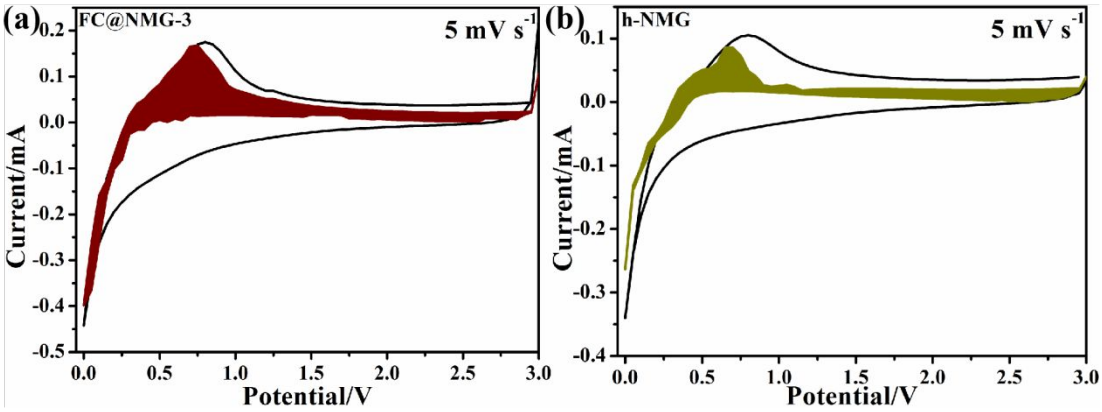

Fig. S12 (a,b) The CV curve at a scan rate of 5 mV s^{-1} marking the pseudocapacity contribution in comparison to the total current.