Electronic supplementary information (ESI)

High Density Co_3O_4 Nanoparticles Confined in Porous Graphene Nanomesh Network Driven by an Electrochemical Process: Ultra-high Capacity and Rate Performance for Lithium Ion Batteries

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Table S1. Composition of the 70%Co-PGN composite.

	Mass fraction / %	Stacking density / g mL^{-1}	Volume fraction / %
FL-PGN	30	0.42	58
Co_3O_4	70	1.33	42

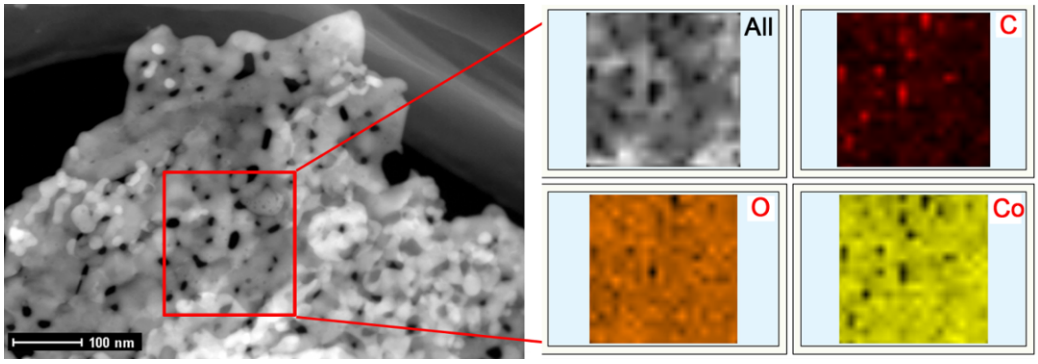

Figure S1. EDS mapping of the 70%Co-PGN composite layers, showing the envenly distributed carbon and cobalt species.

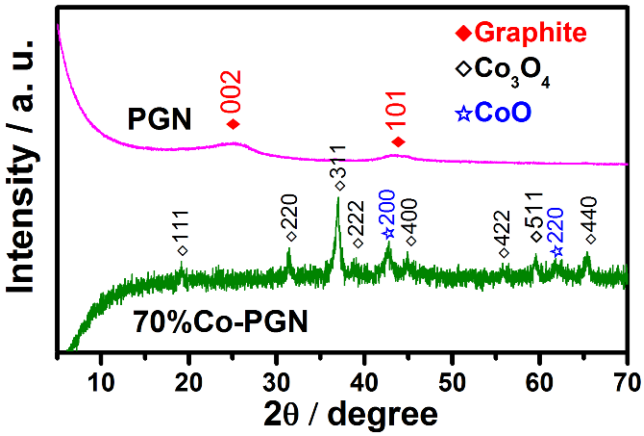

Figure S2. XRD patterns of the PGN and the 70%Co-PGN composite.

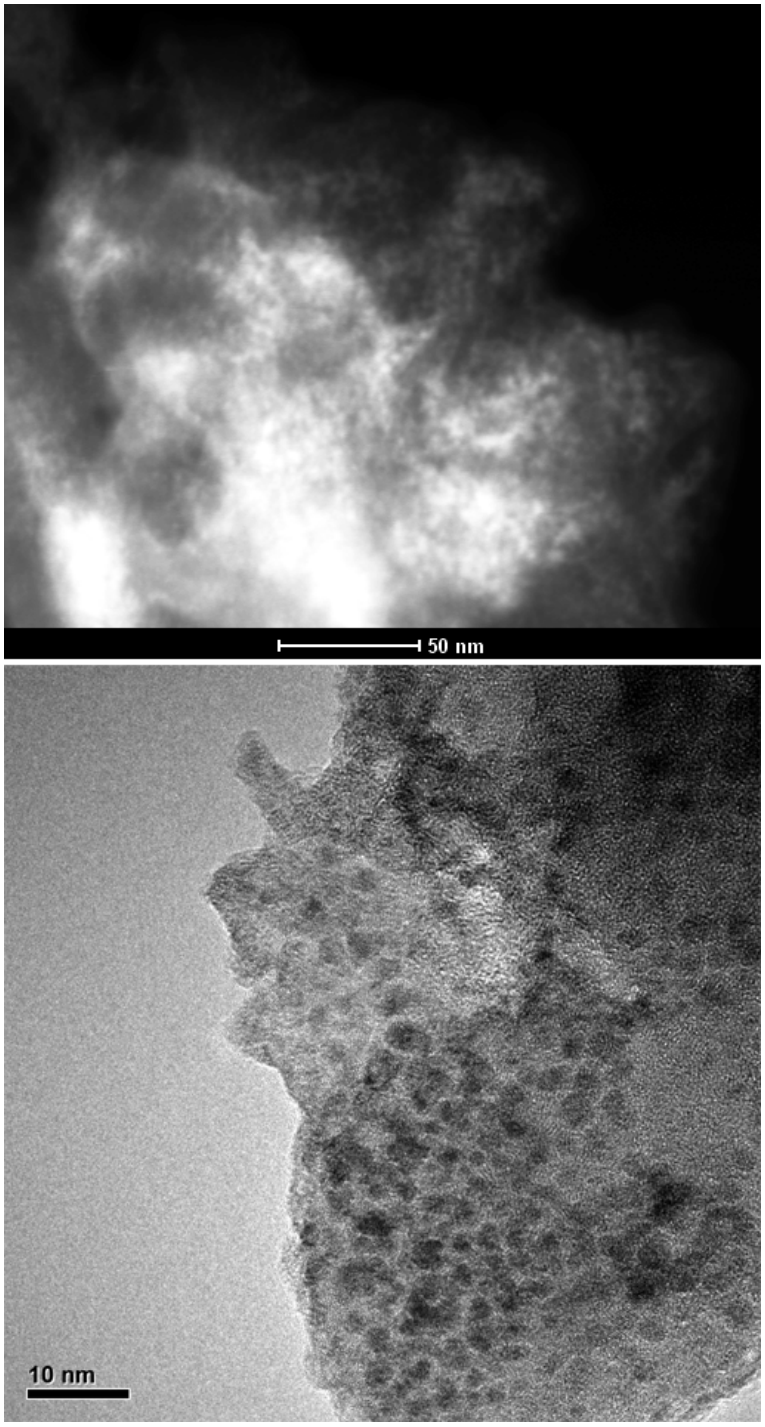

Figure S3. STEM and HRTEM images of the 70%Co-PGN after charge-discharge.

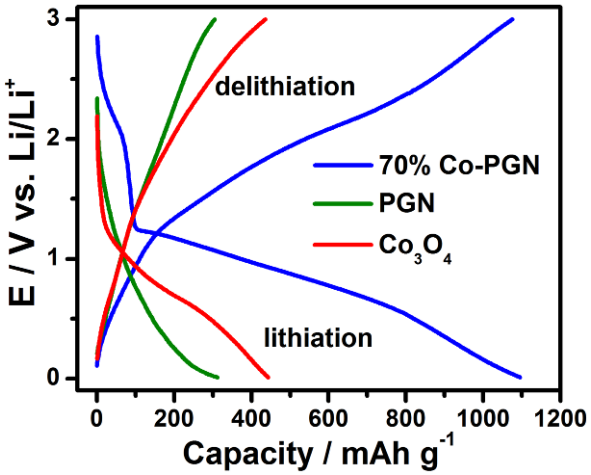

Figure S4. Galvanostatic charge-discharge curves of different anode materials at the current density of 1000 mA g^{-1}.

Table S2. Calculated R_e, R_f and R_{ct} through fitting of the impedance spectra.*

(Ω)	PGN	Co_3O_4	70%Co-PGN
R_e	12.9	1.8	6.0
R_f	24.9	38.3	17.7
R_{ct}	46.2	43.1	34.6

*In the circuit (the inset of Figure 4d), R_e refers to the electrolyte resistance, R_f and CPE_1 are the resistance and capacitor (expressed by a constant phase element) of the surface film formed on the electrodes, R_{ct} and CPE_2 are the double-layer charge-transfer resistance and capacitance (expressed by a constant phase element), and Z_w is a generalized finite Warburg element related to the diffusion of lithium ions into the bulk of the electrodes.

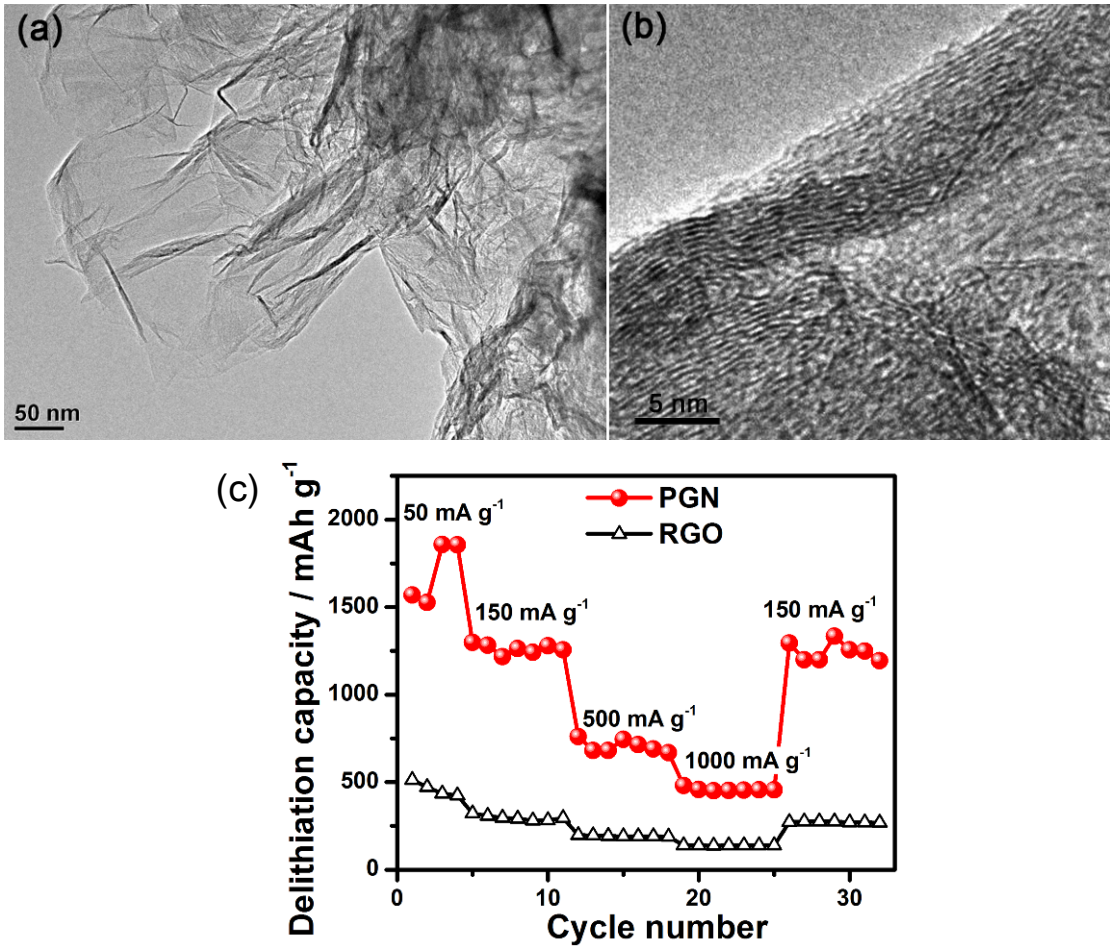

Figure S5. (a) Low magnification and (b) high magnification TEM images of the reduced graphene oxide (RGO). (c) Rate capability of the PGN and the RGO.

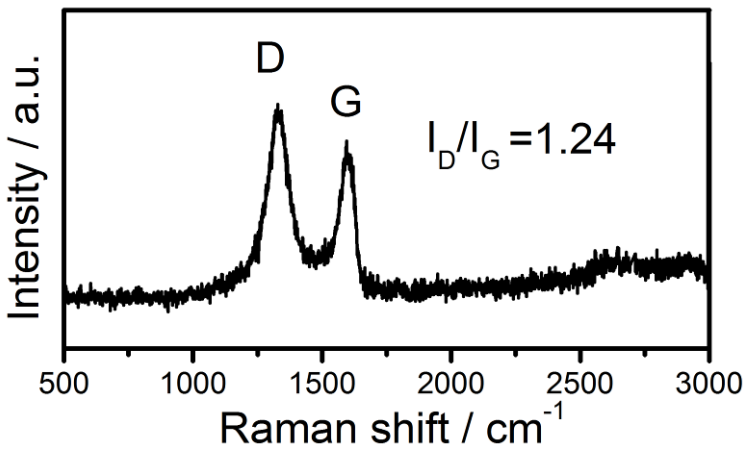

Figure S6. Raman spectrum of the RGO.