Electronic Supplementary Information

Reduced Graphene Oxide Promoted Assembly of Graphene@Polyimide Film as Flexible Cathode for High-performance Lithium-Ion Battery

Bin Chang[a], Jian Ma[a], Tiancai Jiang[b], Li Gao[a], Yuanting Li[a], Mingan Zhou,[a] Yanshan Huang[a*], and Sheng Han[a*]

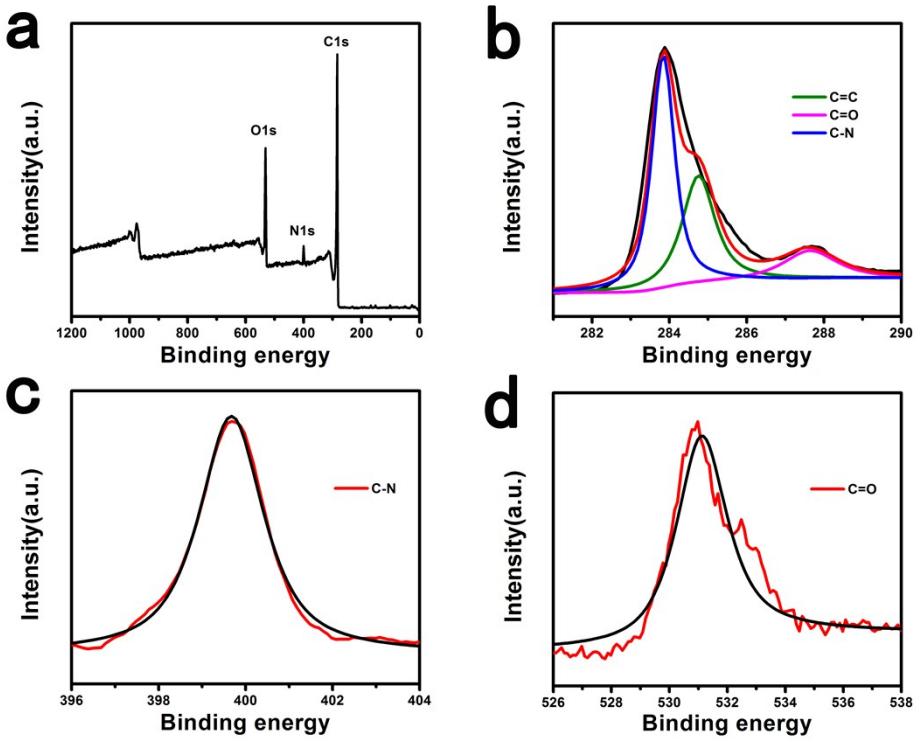


Fig. S1. (a) XPS spectrum of GF-PI and the corresponding high-resolution; (b) C1s; (c) N1s and (d) O1s peaks.

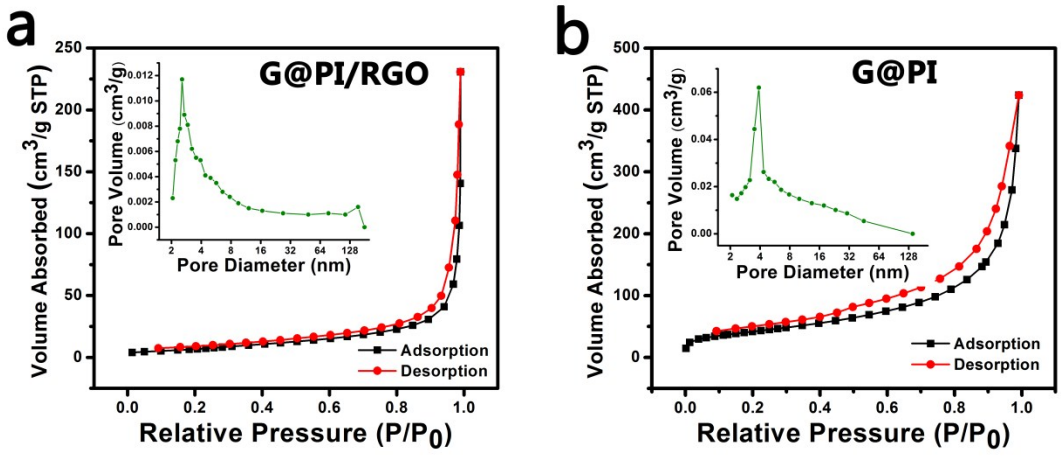


Fig. S2. (a). Nitrogen adsorption-desorption isotherms and the corresponding pore size distribution for G@PI/RGO. (b). Nitrogen adsorption-desorption isotherms and the corresponding pore size distribution for G@PI.

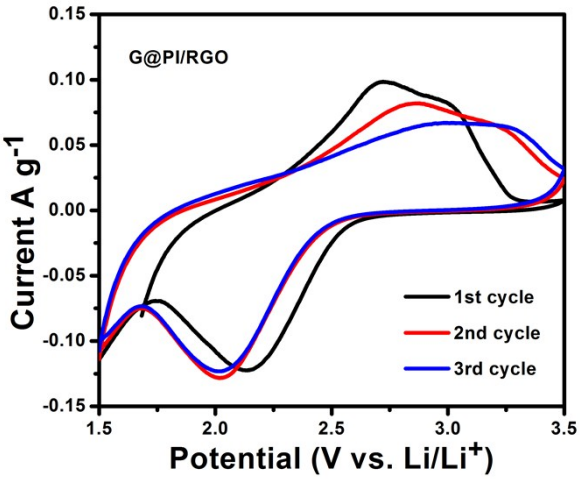


Fig. S3. The CV curves of G@PI/RGO at a scan rate of 0.1 mV s^{-1} during the 1st, 2nd, and 3rd cycles.

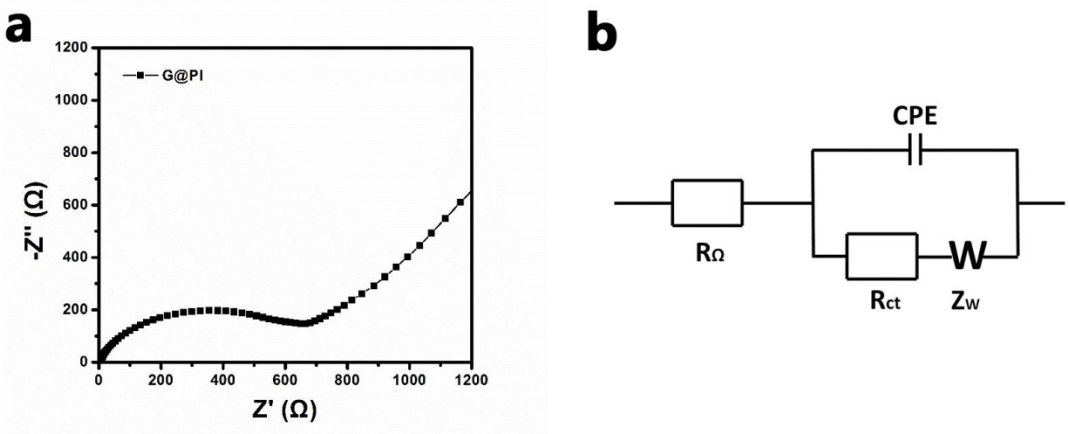


Fig. S4. (a). Nyquist plots for the G@PI electrode before the cycling test. (b). Equivalent circuit for G@PI and G@PI/RGO electrodes.

Table S1. The resistance of G@PI and G@PI/RGO electrodes

Samples	RΩ (Ω)	Rct (Ω)
G@PI	9.718	458.7
G@PI/RGO	6.866	173.2
G@PI/RGO after cycles	2.881	45.95

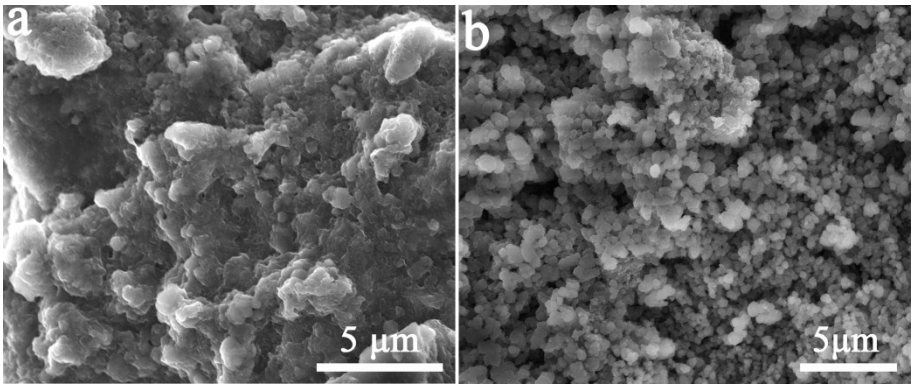
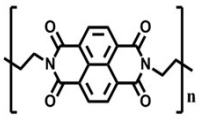
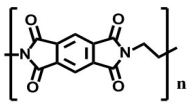
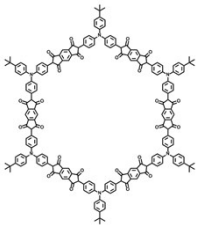
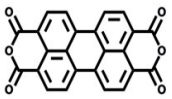
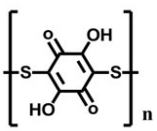
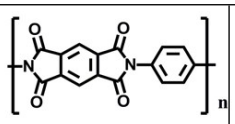
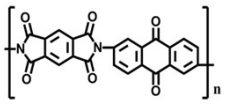
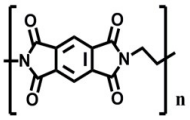


Fig. S5. (a) SEM image of G@PI/RGO after 300 cycles; (b) SEM image of G@PI after 300 cycles.

Table S2. Electrochemical performance of typical PI-based cathode materials for LIB

Materials	**Structures**	**Capacity (mAh g^{-1}) Current density (mA g^{-1})**	**High current density Current density (mA g^{-1})**	**Capacity Retention (Cycles)**	**Ref**
GF/PI (NTCDA/EDA)		213 (50)	102 (4000)	81% (1000 mA g^{-1} 600 Cycles)	J. Mater. Chem. A, 2017, 5, 2710
PI–FLEG (PMDA/EDA)		177 (44.3) 1C=443 mA g^{-1})	38 (2218)	80% (222 mA g^{-1} 2000 Cycles)	RSC Adv., 2016, 6, 33287
PI-COF/RGO		112 (128)	15 (1420)	100% (67 mA g^{-1} 300 Cycles)	Nanoscale, 2019,11, 5330-5335
PTCDA/GF		173 (50)	64 (2000)	92% (100 mA g^{-1} 500 Cycles)	ACS Sus. Chem. Eng. 2018, 6, 8392-8399
PDHBQS–SWCNTs		182 (50)	75 (5000)	124.5 100 mA g^{-1} 500 Cycles)	Adv. Mater. 2018, 30, 1703868

PI / CB (PMDA)		182 (100)	116 (1000)	81% (300 mA g^{-1} 200 Cycles)	Elec. acta. 2017.12.075
PMAQ-SWNT (PMDA)		164 (200)	120 (4000)	91.3 (300 mA g^{-1} 300 Cycles)	J. Mater. Chem. A, 2016,4, 2115-2121
3D-RGO/PI (PMDA)		175 (44.3 1C=443 mA g^{-1})	101 (886)	82% (221 mA g^{-1} 300 Cycles)	J. Mater. Chem. A, 2014, 2, 10842
G@PI/RGO (NTCDA/EDA)		198 (30)	86.1 (8000)	93% (1000 mA g^{-1} 300 Cycles) 74% (1000 mA g^{-1} 2000 Cycles)	This work