Supporting information for

In-situ iodine doped graphene /silicon composite paper as a highly conductive and self-supporting electrode for lithium ion batteries

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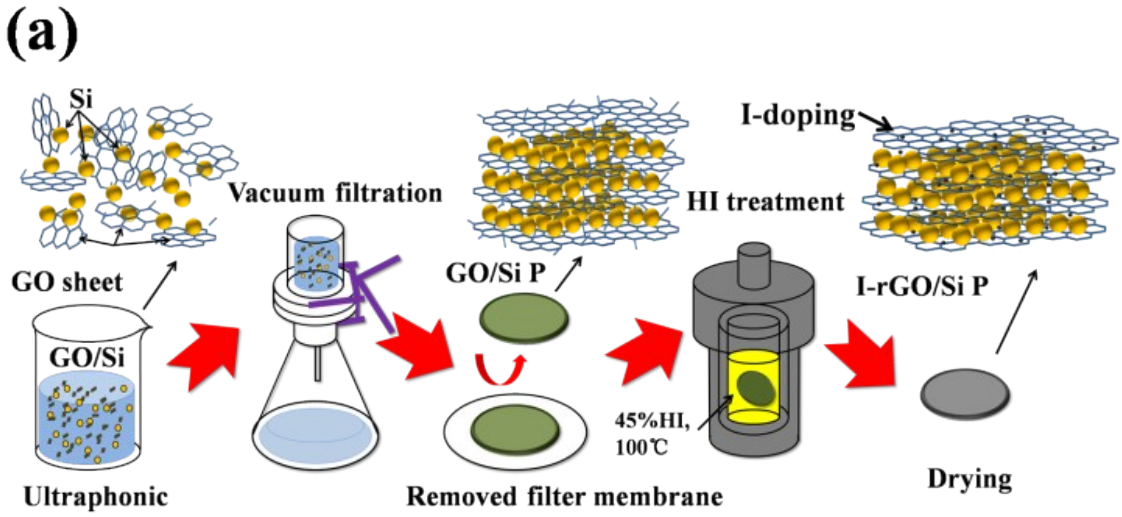
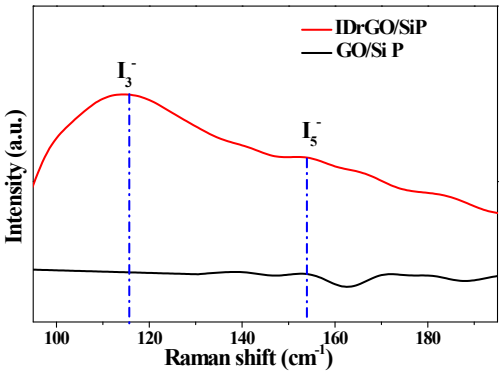
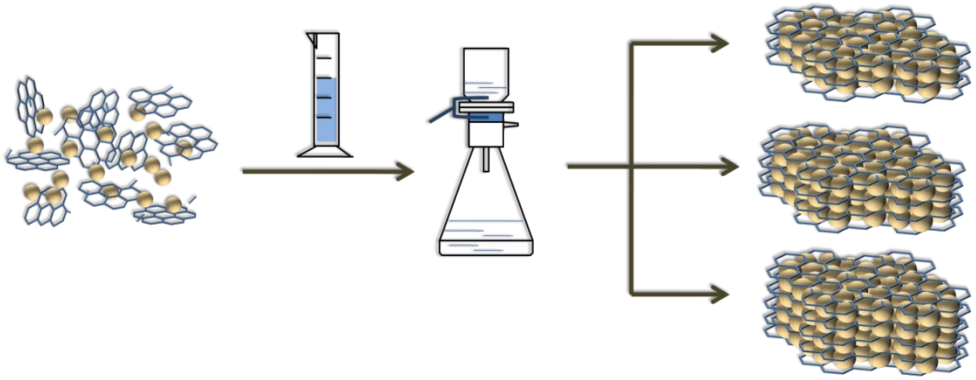


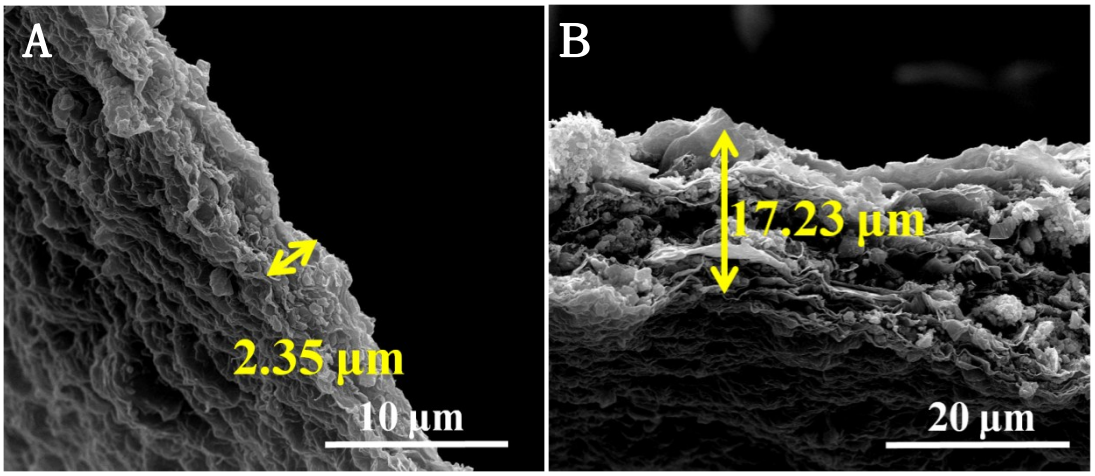
S1 Schematic synthesis of in-situ iodine doped rGO/Si composite paper (I-rGO/Si P).



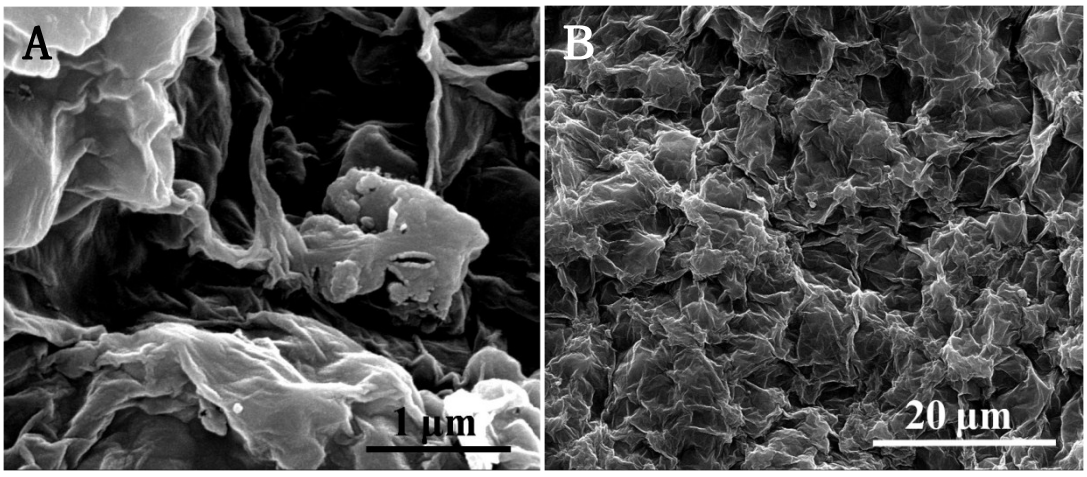
S2 Two new peaks located at 116 cm^{-1} and 154 cm^{-1}, which are absent for both pristine and restored graphene.



S3 Direct the controlling of thickness of IDrGO/Si P by the different dosage of precursor solution

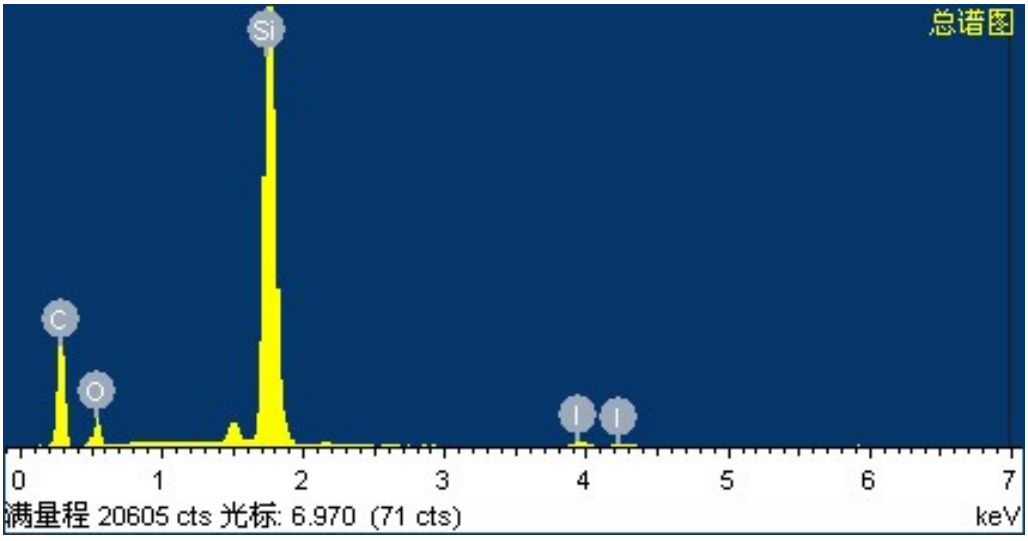


S4 The cross-sectional SEM images of I doped rGO/Si composite paper by (A)2ml and (B) 10 ml precursor solution.

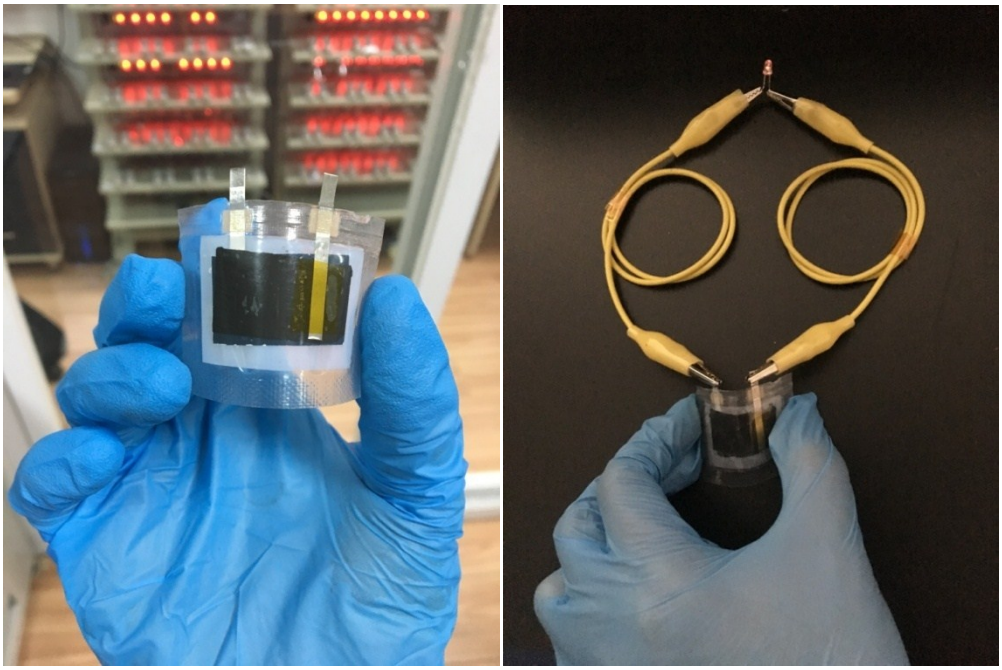


S5 The planform SEM images of (A) GO/Si P(spray gold) (B) I-rGO/Si P(spray gold).

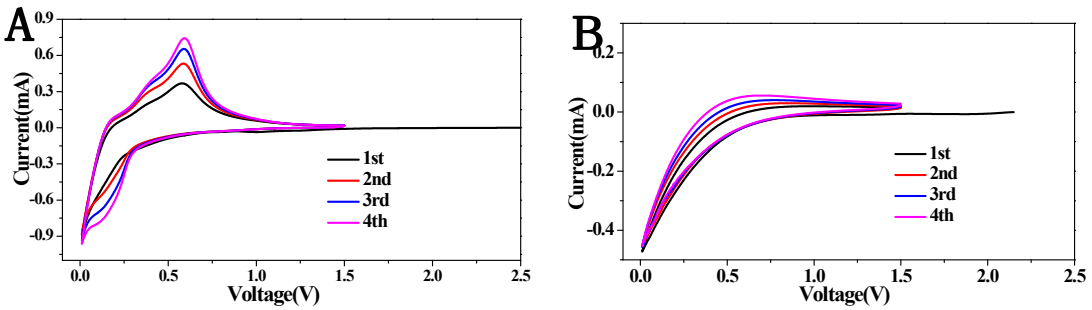
Element	Mass ratio(%)	Atomic ratio(%)
C K	61.19	75.24
O K	12.43	11.47
Si K	24.94	13.12
I L	1.43	0.17
Total amount	100.00	100.00



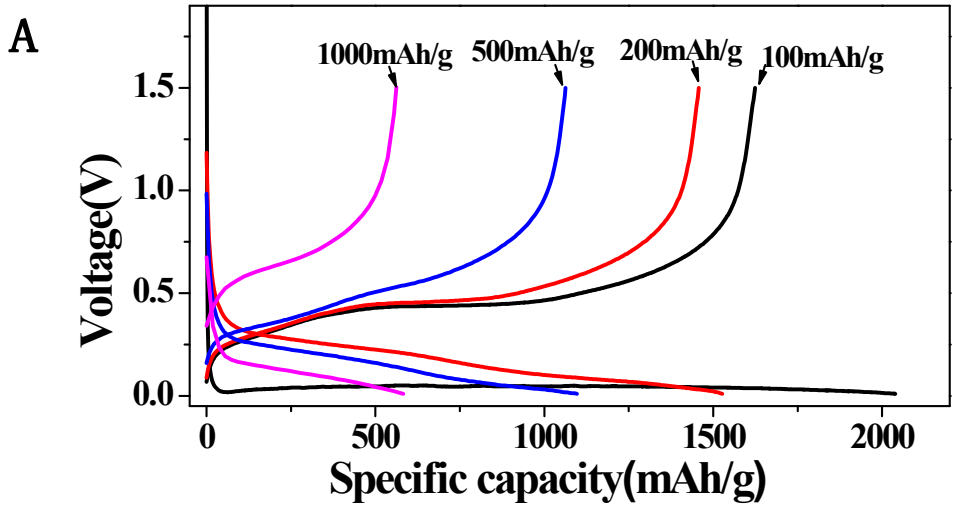
S6 The EDS data of the I atomic ratio.



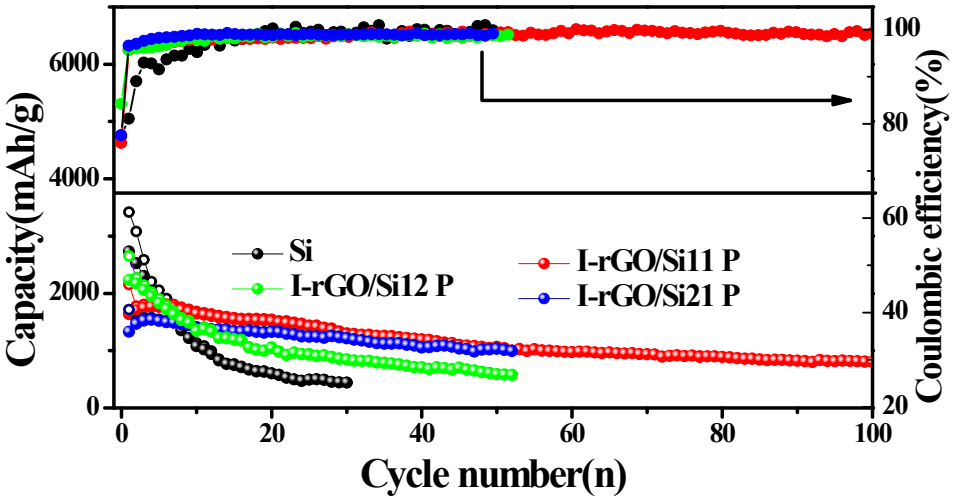
S7 I-rGO/Si P as a flexible battery was demonstrated by a home-made pouch cell and the flexible device light a red LED.



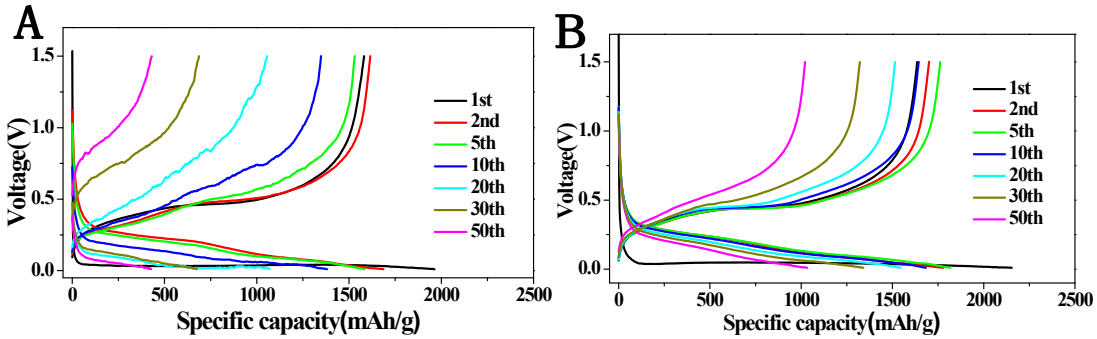
S8 CV curves of self-supporting Si and I-rGO P in the initial four cycles at scan rate of 0.1mVs^{-1} in the potential range of 0 to 1.5V (vs. Li/Li^{+})



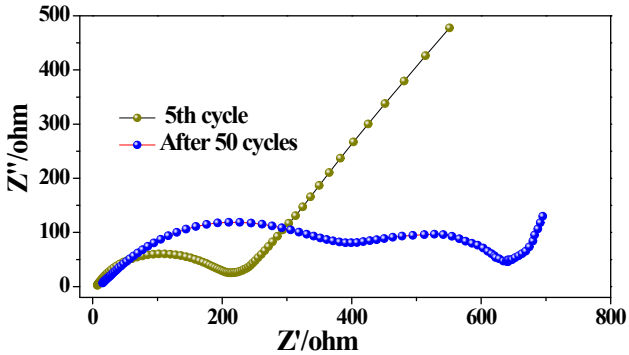
B



S9 (A) Cycling performance of I-rGO/Si P with different compositions, and the pristine Si for comparison. (B) Cycling performance and coulombic efficiency of the self-supporting I-rGO/Si P with different compositions and the pristine Si at current densities of 100 mA·g^{-1}



S10 The galvanostatic charge/discharge profiles of rGO/SiP and I-rGO/SiP in the initial 50 cycles



S11 Nyquist plots of the rGO/Si P after 5 cycles and 100 cycles from 100 kHz to 0.01 Hz in the fully charged state.