Electronic Supplementary Information for

Polyacrylonitrile/Graphene composite as a precursor of sulfur-based cathode material for high-rate rechargeable Li-S batteries

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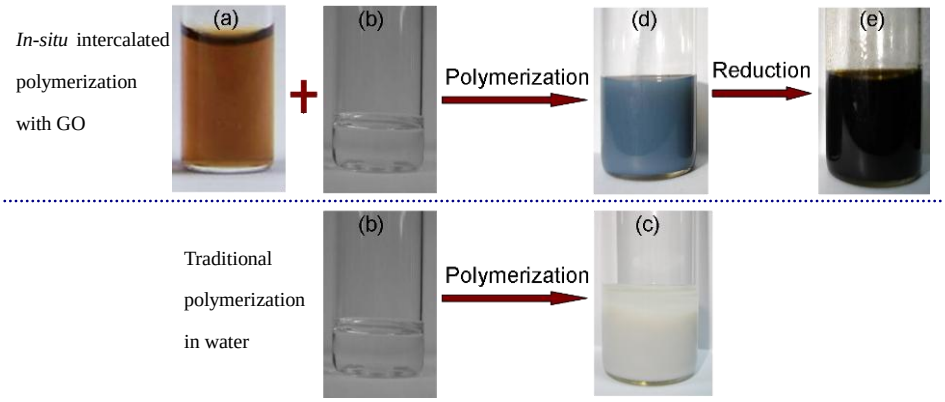

Fig. S1. Photographs of aqueous dispersions of GO (a), AN (b), PAN (c), PAN/GO (b) and PAN/GNS (e).

Table S1. GO or GNS content in the products:

Samples	GO or GNS content in ca. wt%		
PAN/GO [a]	20	10	5
PAN/GNS [b]	16	8	4
pPAN-S/GNS [c]	8	4	2

[a]As-prepared PAN/GO

[b]After reduction (GNS contents are less than these of GO due to the loss of functional groups in the process of reduction.)

[c]After thermal treatment with S (GNS contents decreased due to the S was embedded in composite after thermal treatment.)

Table S2. Component distributions of the final products in ca. wt%:

Samples	S	pPAN	GNS
pPAN-S	47	53	0
pPAN-S/GNS 2%		51	2
pPAN-S/GNS 4%		49	4
pPAN-S/GNS 8%		45	8

Table S3. BET measurement results of different samples:

Samples	PAN	pPAN-S	PAN/GNS	pPAN/GNS	pPAN-S/GNS
BET total surface area (m^2g^{-1})	19.41	10.76	37.25	35.85	25.41

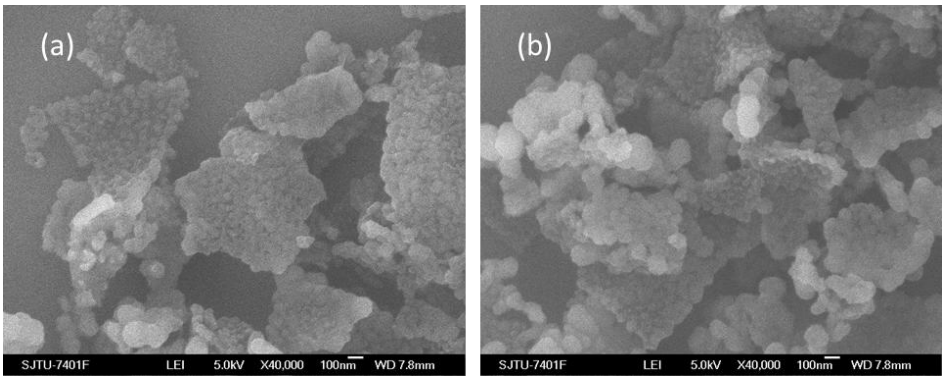

Fig. S2. SEM images of PAN/GNS (a) and pPAN/GNS (b).

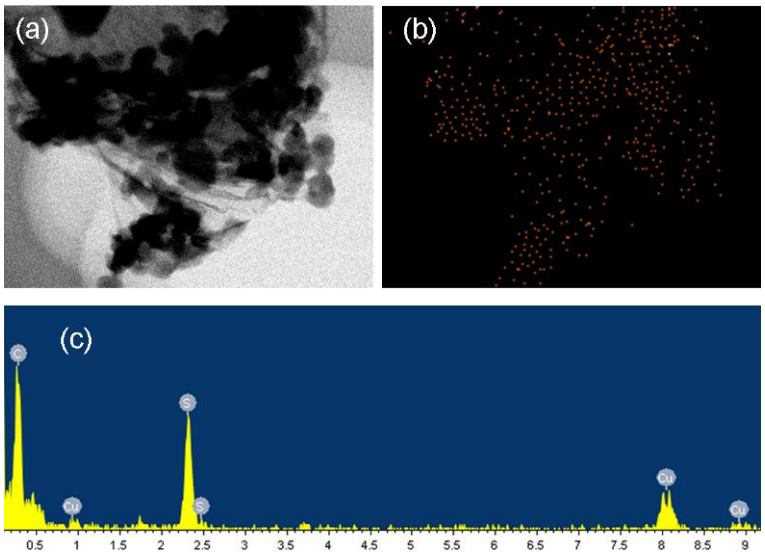

Fig. S3. TEM image and elemental mapping of pPAN-S/GNS 4% composite. (a) TEM image of pPAN-S/GNS composite; Elemental mapping of (b) sulfur and (c) EDS spectrum captured for the region shown in (a).

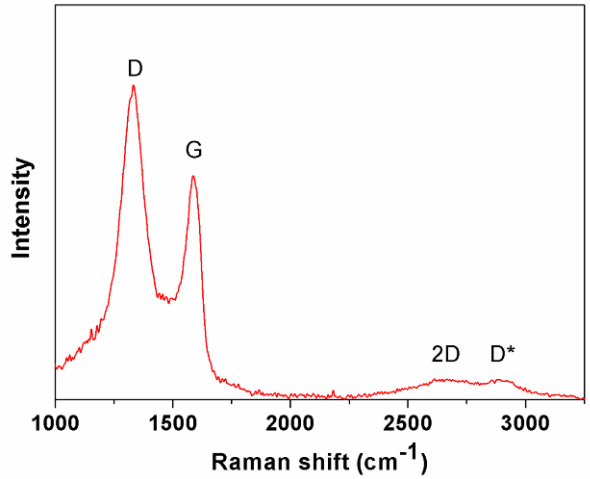

Fig. S4. Raman spectrum of GNS.

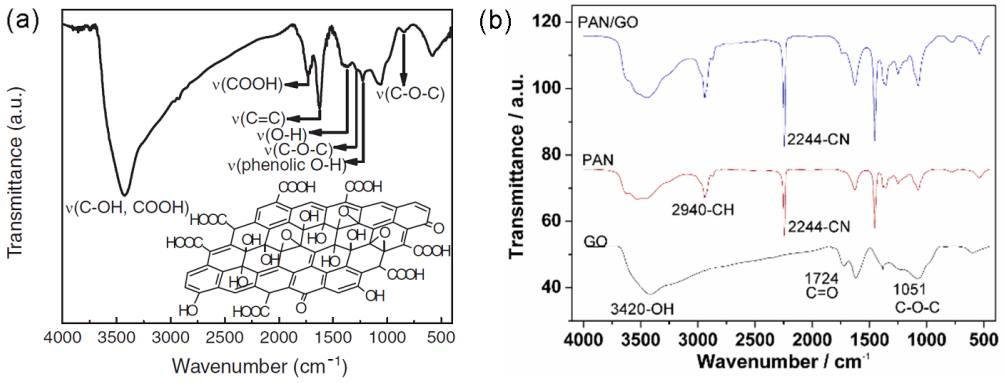

Fig. S5. FTIR spectra of GO, PAN and PAN/GO composite.

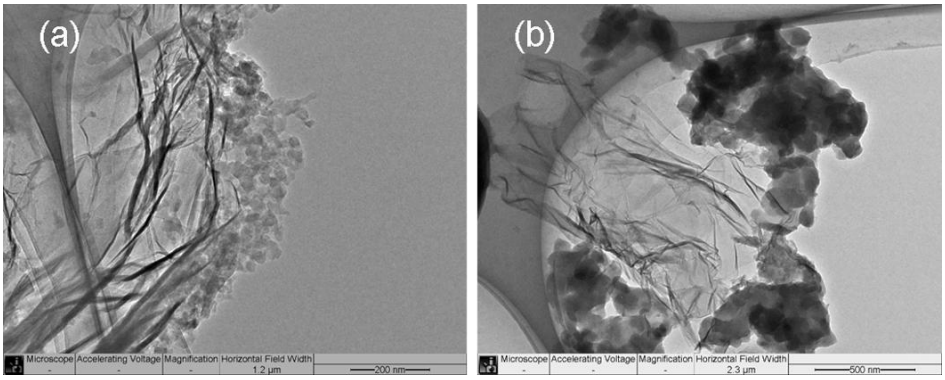

Fig. S6. TEM images of PAN/GNS (a) and pPAN-S/GNS (b) composite with GNS content ca. 8%

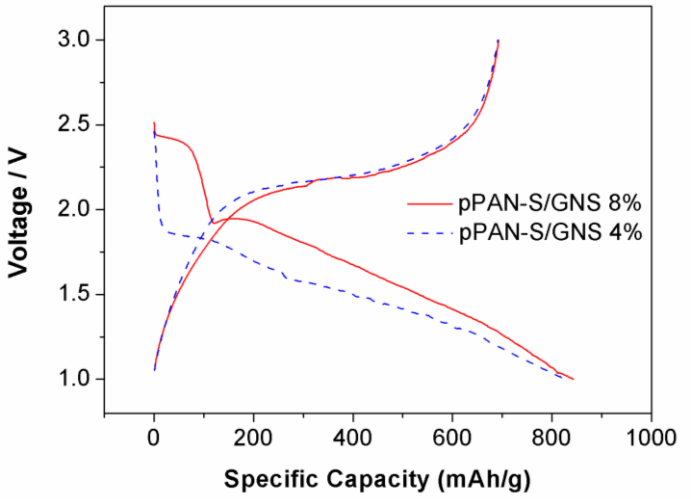

Fig. S7. First discharge/charge profiles of pPAN-S/GNS composite electrodes with 8% and 4% GNS.

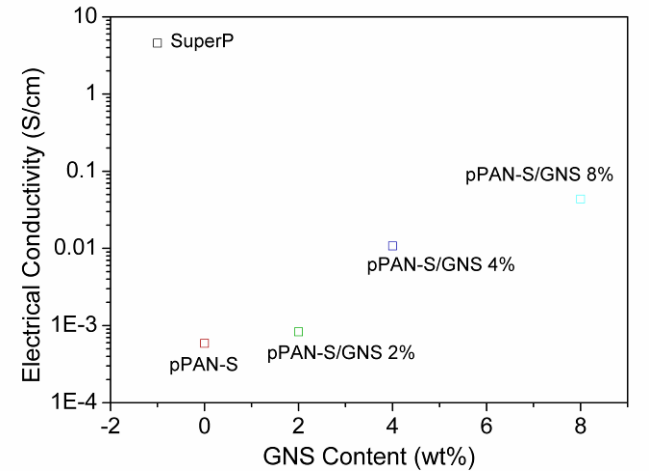

Fig. S8. Electronic conductivities of the pPAN-S/GNS composites with different GNS contents.