Supporting information

A high-efficiency N/P co-doped graphene/CNT@porous carbon hybrid matrix as cathode host for high performance lithium-sulfur batteries

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Fig.S1. XRD patterns (a), Conductivity properties (b) and Roman spectras (c) of 10.0wt%-PGC@HEWC and 15.0wt%-PGC@HEWC materials.

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**Fig. S2.** XRD patterns of PG@HEWC/S, PC@HEWC/S, 5.0wt%-PGC@HEWC/S and HEWC/S composites.
Fig. S3. Electrochemical performance of the 10.0wt%-PGC@HEWC/S and 15.0wt%-PC@HEWC/S composites as the cathode materials for Li-S batteries. The charge/discharge curves of 10.0wt%-PGC@HEWC/S (a) and 15.0wt%-PGC@HEWC/S (b) cathodes at 0.1C, respectively. (c) Cycling performance of the 10.0wt%-PGC@HEWC/S and 15.0wt%-PGC@HEWC/S cathodes at the charge/discharge rate of 0.1 C.
Fig. S4. XPS survey spectrum of 5.0wt%-PGC@HEWC/S composite.
**Fig.S5** Sealed vials of a Li$_2$S$_4$/THF solution (A), and after contact with PC@HEWC (B), PG@HEWC (C), and HEWC (D) immediately upon contact and after stirring for 1 h.
Fig. S6. Cyclic voltammetry of the initial three cycles at a scan rate of 0.1 mV s$^{-1}$. 