

CTAB-modified S/C nanocomposite cathode for high performance lithium–sulfur batteries

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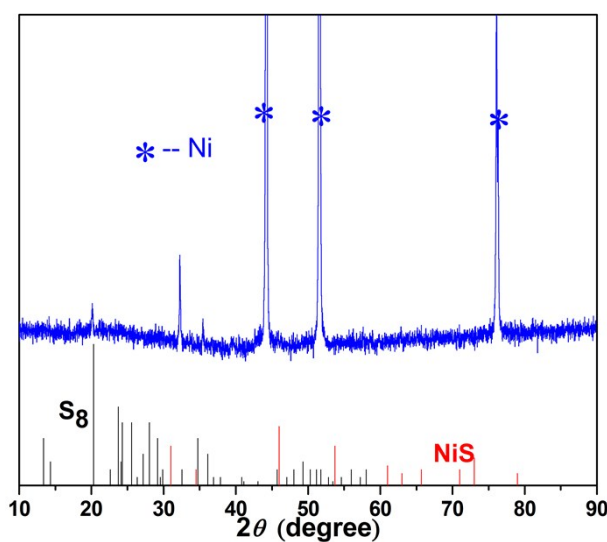


Fig. S1. The XRD patterns of sulfur on Ni foam after 40 cycles of charge-discharge processes. No diffraction peaks from NiS can be observed, excluding the formation of NiS.

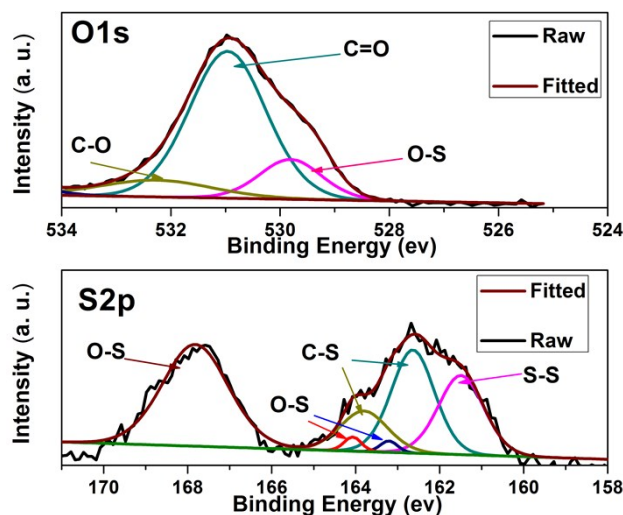


Fig. S2. XPS spectra of S/RGO nanocomposite. In the high-resolution O 1s spectrum (a), the strong peak at 530.8 eV can be fitted by three peaks, which are assigned to C-O bond, C=O bond and O-S bond respectively.^{1,2} In the high-resolution S 2p spectrum (b), two strong peaks at about 162.8 eV and 161.5 eV are observed, which can be assigned to active S species with the C-S and S-S bond. The shoulder peaks (164.3 eV, 163.2 eV and 163.8 eV) are attributed to the O-S and C-S bonds.³ Furthermore, the peak at 168.2 eV can be assigned to the O-S bond arising from the sulphate species formed by oxidation of S. These chemical bonds between RGO and S can trap the S on the surface of RGO and limit the diffusion of lithium polysulfide into the electrolyte.³

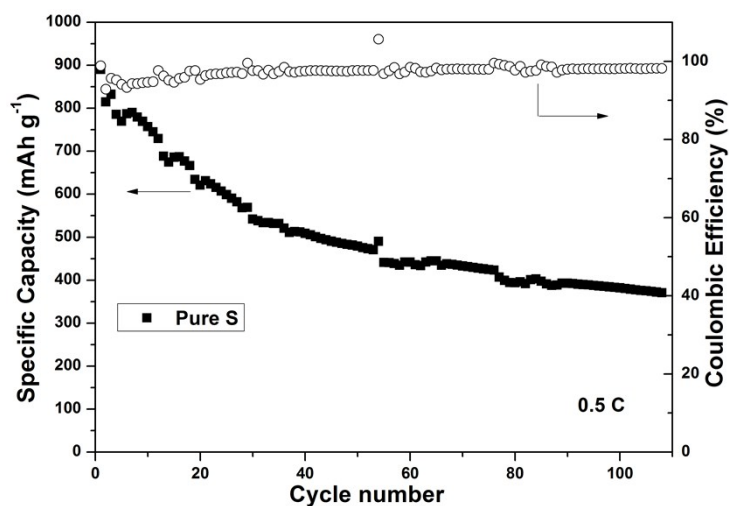


Fig. S3. The cycling performance of the pure S cell using LiNO₃-free electrolyte.

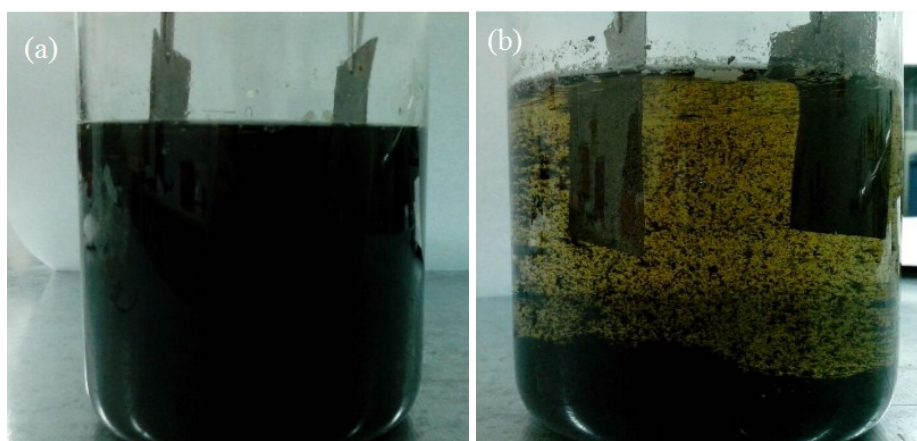


Fig. S4. (a) The mixed aqueous solution of $\text{Na}_2\text{S}\cdot 9\text{H}_2\text{O}$ and GO with CTAB showed very good dispersion and uniformity as working-solution. (b) Many of the RGO sediments were found at the bottom of the beaker without CTAB during the electrochemical assembly processes.

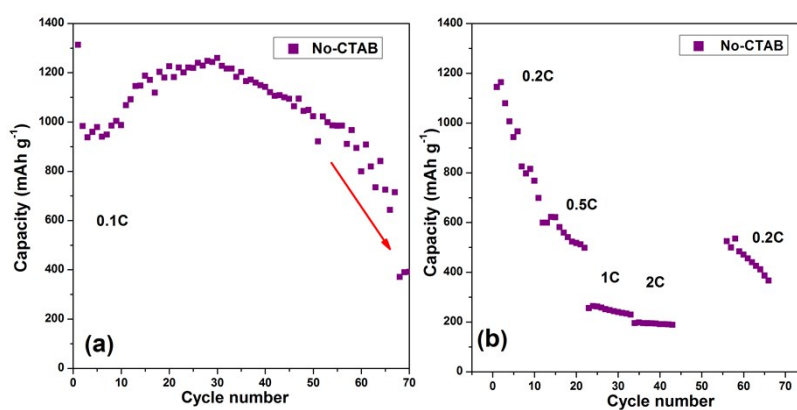


Fig. S5. (a) Cycling performance of S/RGO composite without CTAB modified cathodes at the 0.1C rate. (b) Poor rate performances of S-RGO cathodes.

References

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