Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2020

Supporting Information

Reduce graphene oxide/TiO_2(B) nanocomposite modified separator as efficient suppression of polysulfide shuttling in Li-S batteries

Peng Chen[a,b,c], Zexi Wang[a], Bingyu Zhang[a], Heng Liu[a], Wanqiang Liu[*,a,b,c], Jianxun Zhao[**a,b], Zhihua Ma [a,b,c], Wenyue Dong [a,b,c], Zhongmin Su[a,c]

[a]*School of Materials Science and Engineering, Changchun University of Science and Technology, Changchun 130022, China*

[b]*Engineering Research Center of Optoelectronic Functional Materials, Ministry of Education, China*

[c]*Jilin Provincial Science and Technology Innovation Center of Optical Materials and Chemistry, China*

[*]Corresponding author. E-mail: wqliu1979@126.com (W.L.), diligentzjx@126.com (J.Z)

Characterization

The crystal structure and phase identification of the samples were analyzed by Rigaku, D/max-2500 X-ray diffractometer (XRD). Morphology was detected by the FEI Quanta 250 field-emission scanning electron microscope (SEM) and Energy-dispersive spectroscopy (EDS). X-ray photoelectron spectroscopy (XPS) was tested on the ESCALABMKLL (Thermo Fisher Scientific company). The molar ratio of sulfur (S) and lithium sulfide (Li_2S) was 5:1 in electrolyte to synthesize Lithium polysulfide (Li_2S_6) solution and kept stirring at room temperature for 48 h in glovebox.

Cyclic voltammetry (CV) measurements were performed at a scan rate of 0.1 mV s^{-1} on the electrochemical station (CHI760D, Chenhua Instrument Company). Electrochemical impedance spectroscopy (EIS) tests were applied using the Biologic VMP3 electrochemical workstation in the frequency range from 0.01 Hz to 1 MHz. The cycling stability and rate capacity were tested using a Battery Testing System (LAND CT2001A) within a potential range of 1.7-2.8 V vs. Li/Li^+.

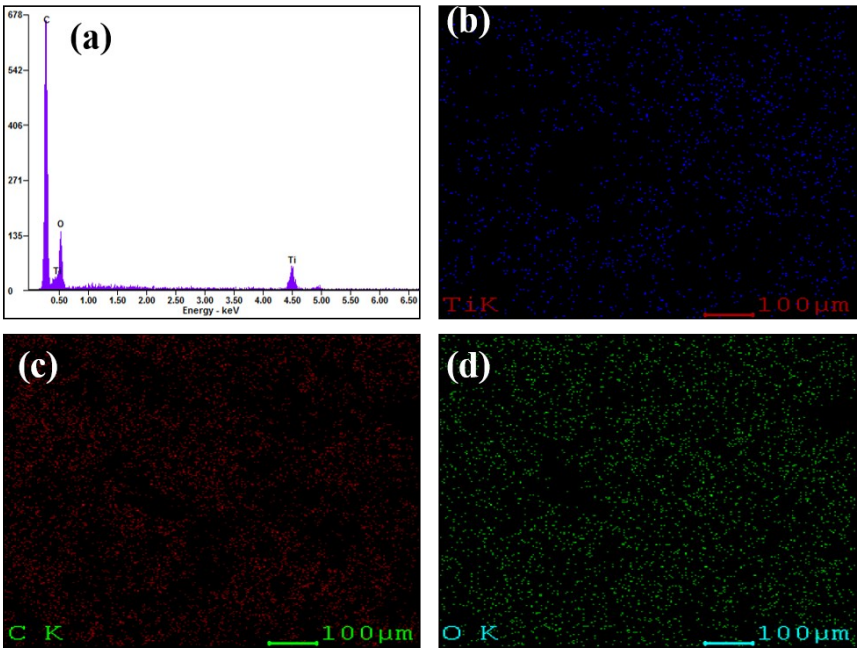

Fig. S1. EDX spectrum and mappings of the RGO/TiO_2(B) composite surface.

Fig. S2. The photograph of RGO/TiO_2(B) modified separator with thicker coating.

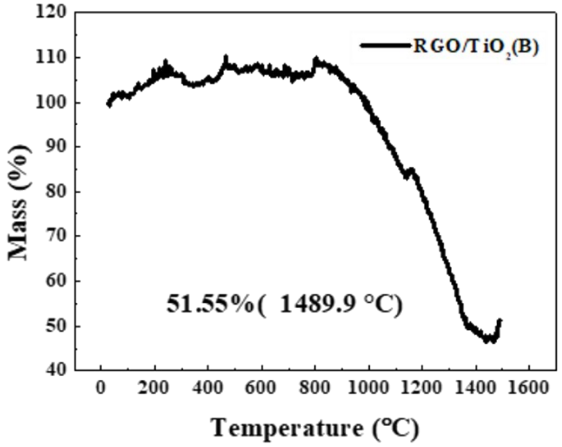

Fig. S3. Thermogravimetric analysis curve of RGO/TiO_2(B).

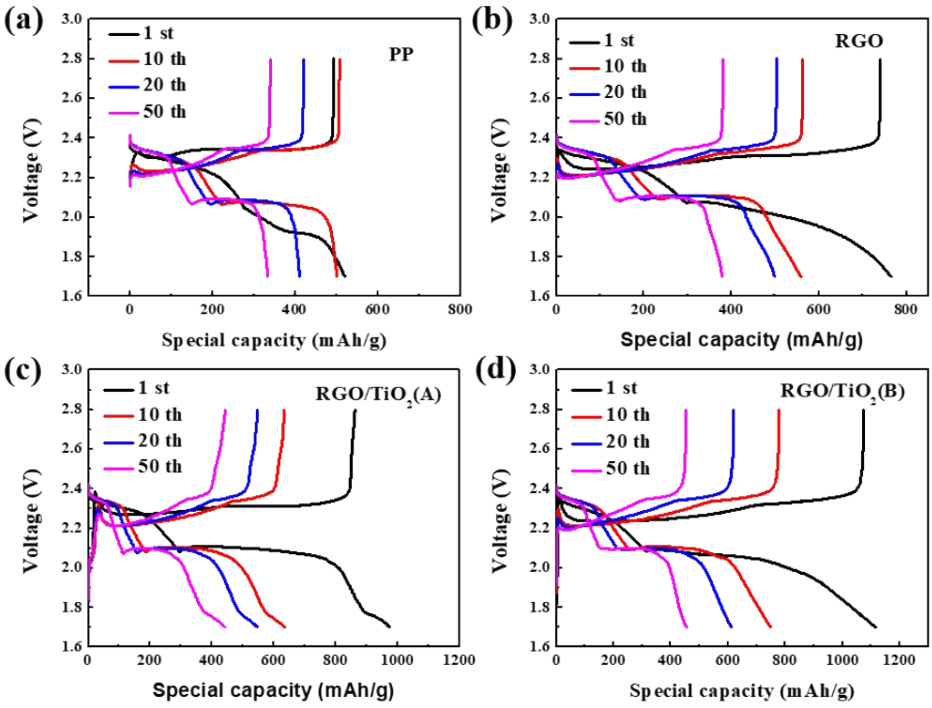

Fig. S4. The charge-discharge curves of different cycles at a rate of 0.2 C for batteries with the separators with different coating.

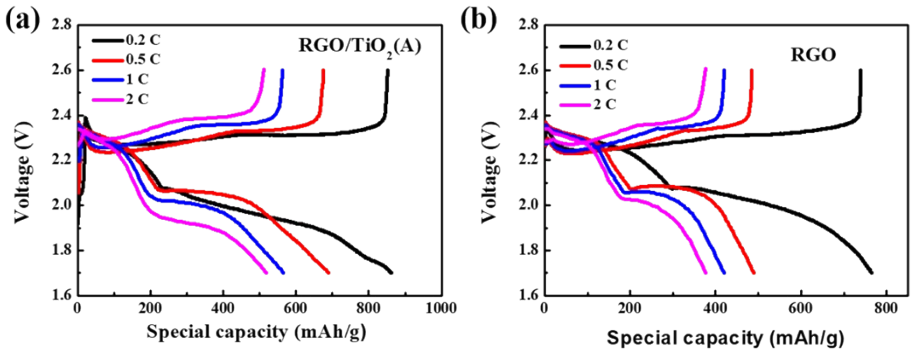

Fig. S5. The charge-discharge voltage curves of batteries with separators at various rates from 0.2 C to 2 C.