

Supplementary Information

Three-dimensional hollow reduced graphene oxide spheres with hierarchically porous structure for high performance lithium-sulfur batteries

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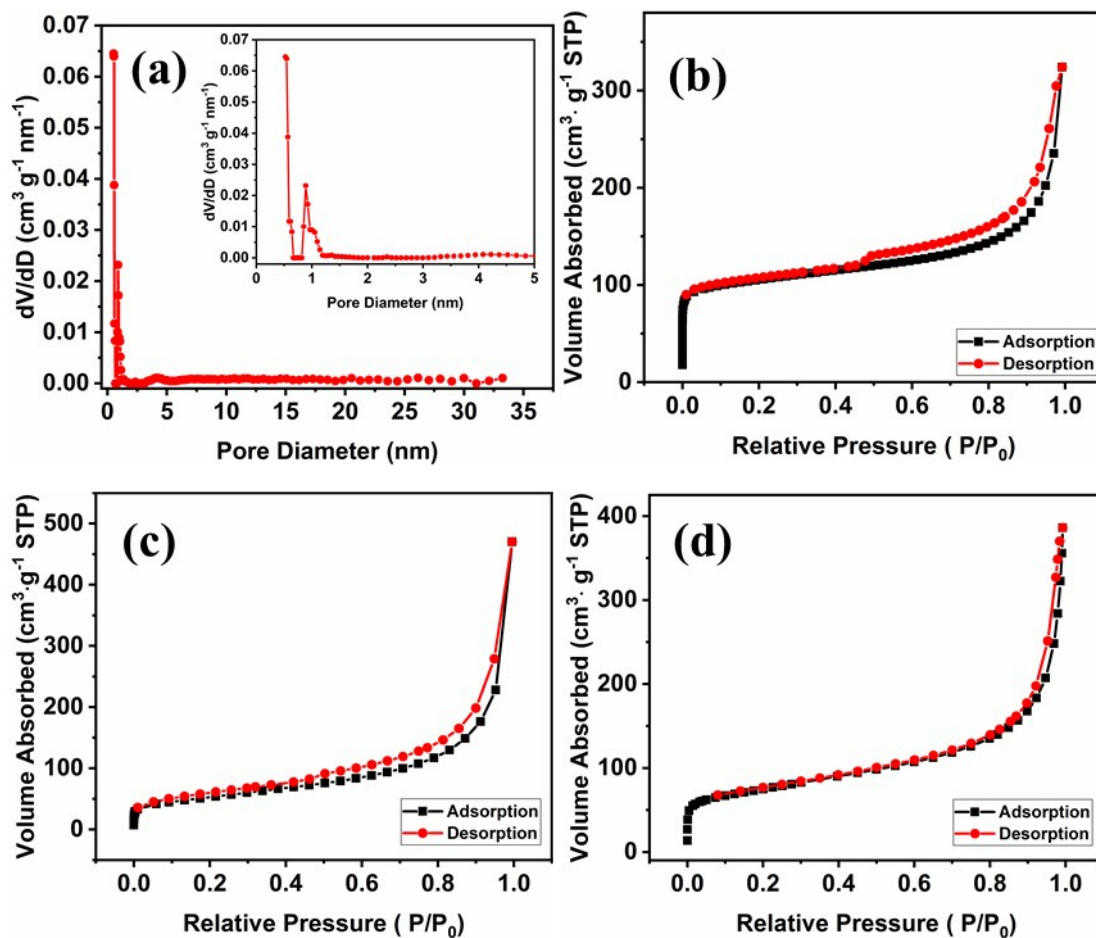


Fig.S1. (a) Pore size distribution curve of rGO, Nitrogen adsorption/desorption isotherms of (b) rGO, (c) HrGO spheres without the addition of PVP, and (d) HrGO spheres with the addition of PVP.

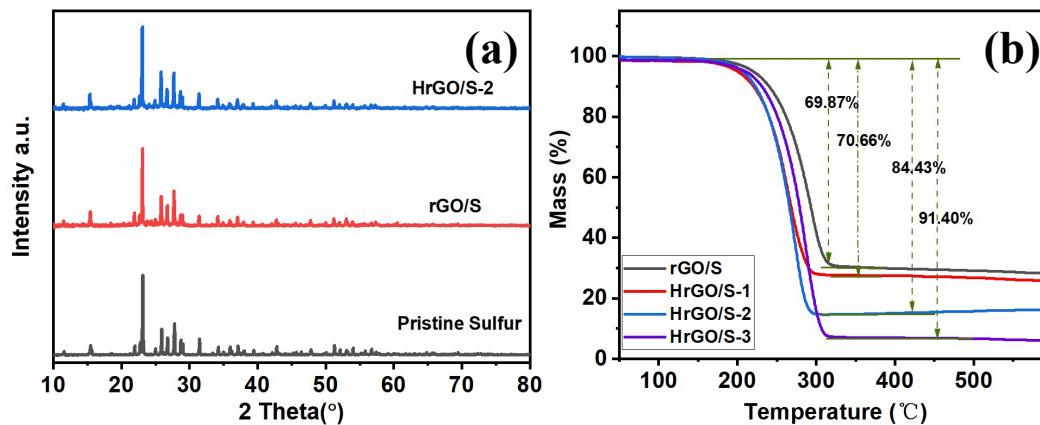


Fig. S2. (a) XRD patterns of pristine sulfur, rGO/S and HrGO/S-2 composites. (b) TG curves of rGO/S, HrGO/S-1, HrGO/S-2, and HrGO/S-3 composites.

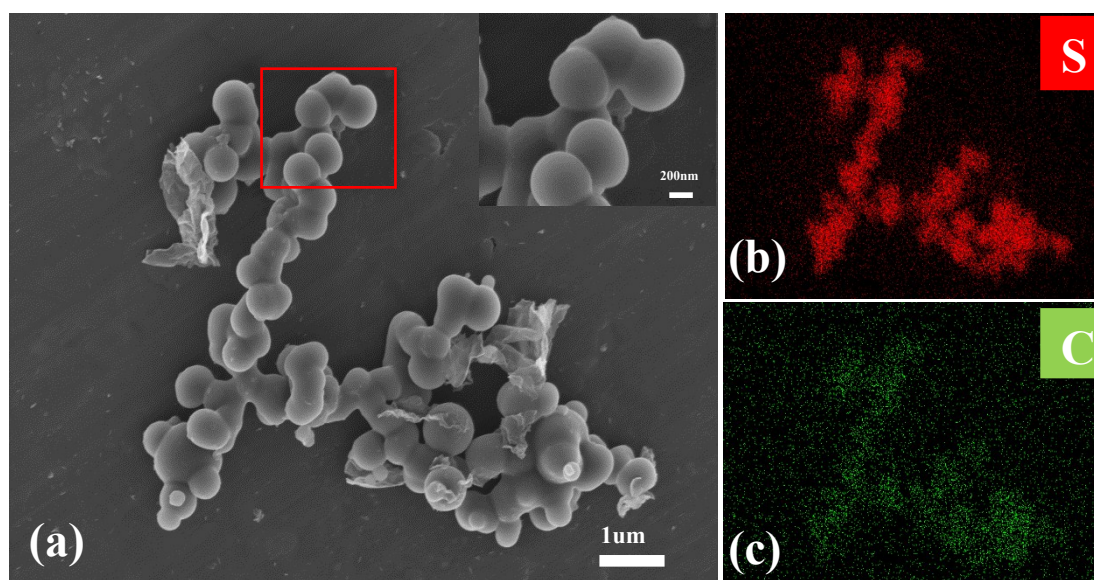


Fig.S3. (a) SEM images of HrGO/S-2 (inset is magnified image of the selected region), EDS elemental mapping of (b) S and (c) C of the region in image (a).

	Re (Ω)	Rst (Ω)	Rct (Ω)
rGO/S After 1 cycle	8.519	78.57	108.7
HrGO/S-2 After 1 cycle	7.465	70.79	42.91
HrGO/S-2 After 100 cycles	7.243	26.58	26.65

Table.S1 Summary of the relevant parameters determined from the fitting of the EIS curves

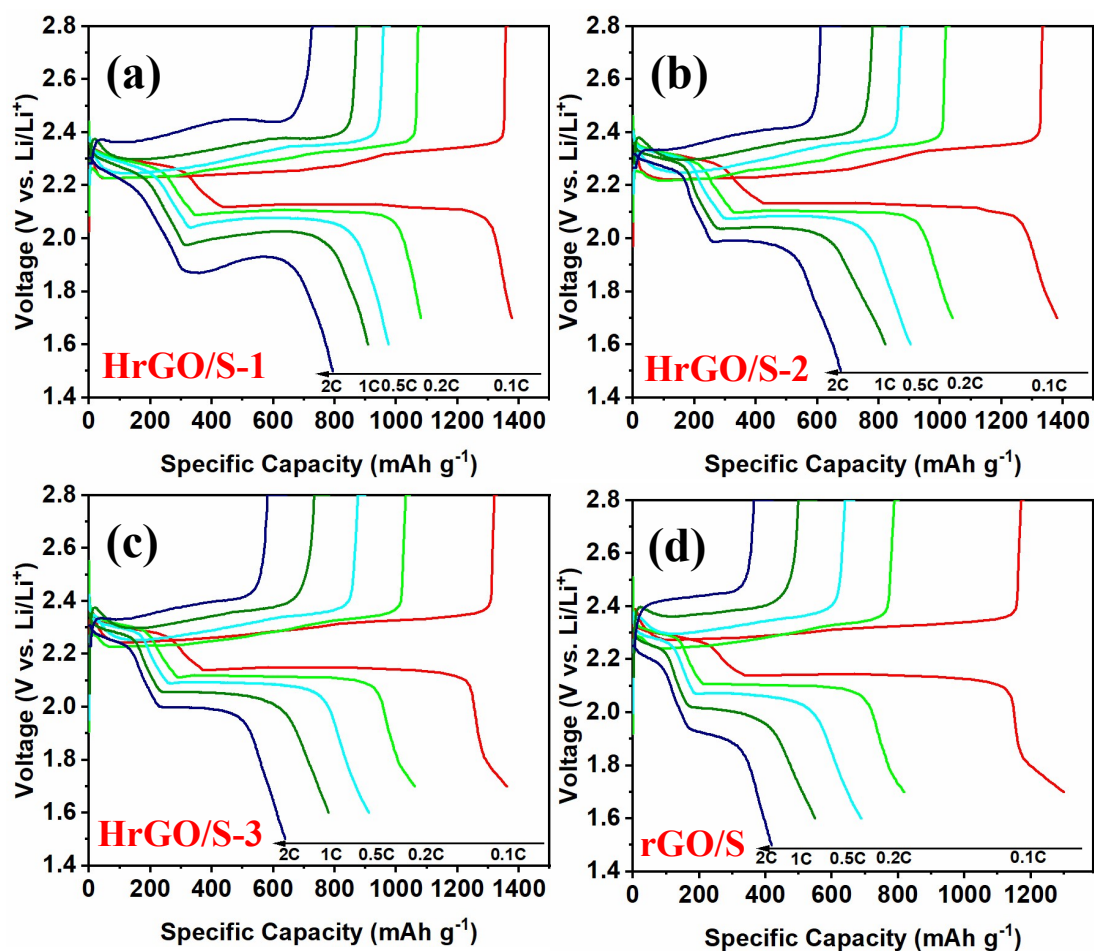


Fig. S4. (a) Discharge/charge voltage profiles of (a) HrGO/S-1, (b) HrGO/S-2, (c) HrGO/S-3 and (d) rGO/S at different C-rates, ranging from 0.1 C to 2 C.

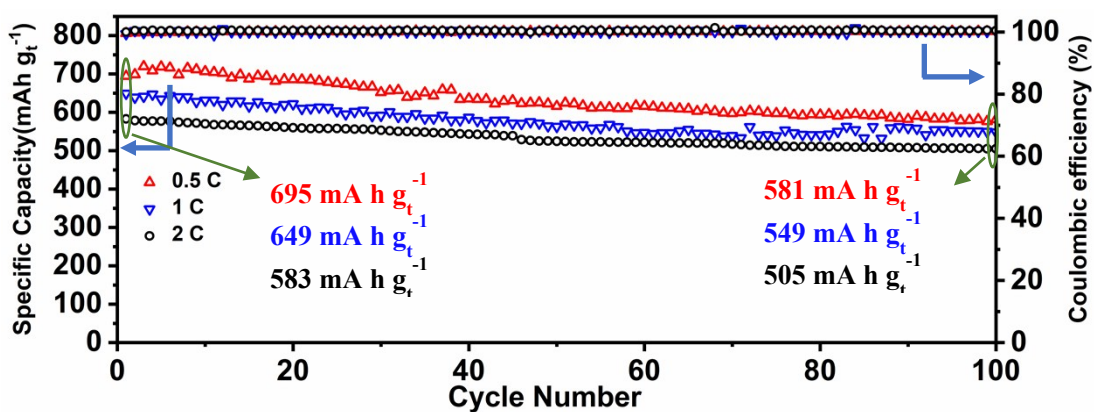


Fig.S5. Cycling performance and coulombic efficiency of HrGO/S-2 based on the total mass of the cathode materials at the current rate of 0.5 C, 1 C, and 2 C over 100 cycles. (The total mass of the cathode materials includes the mass of HrGO/S composites, super P, and PVDF.)

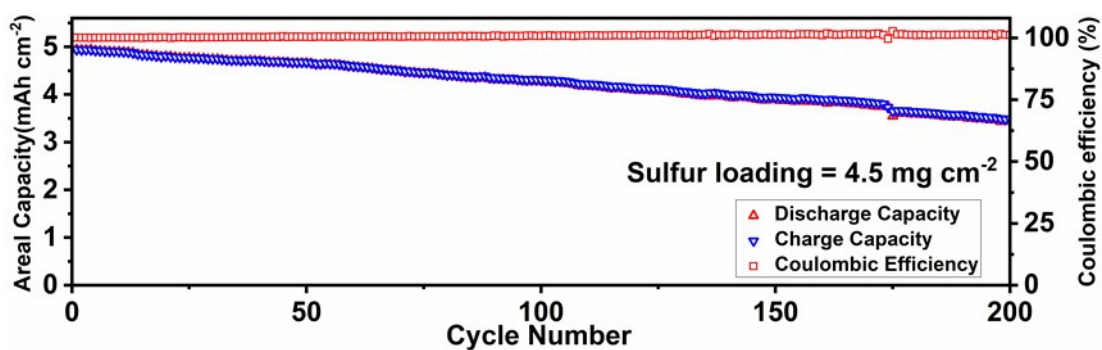


Fig.S6. Areal capacity and coulombic efficiency of HrGO/S-2 with the sulfur loading of 4.5 mg cm^{-2} at the current density of 1.5 mA cm^{-2} over 200 cycles.

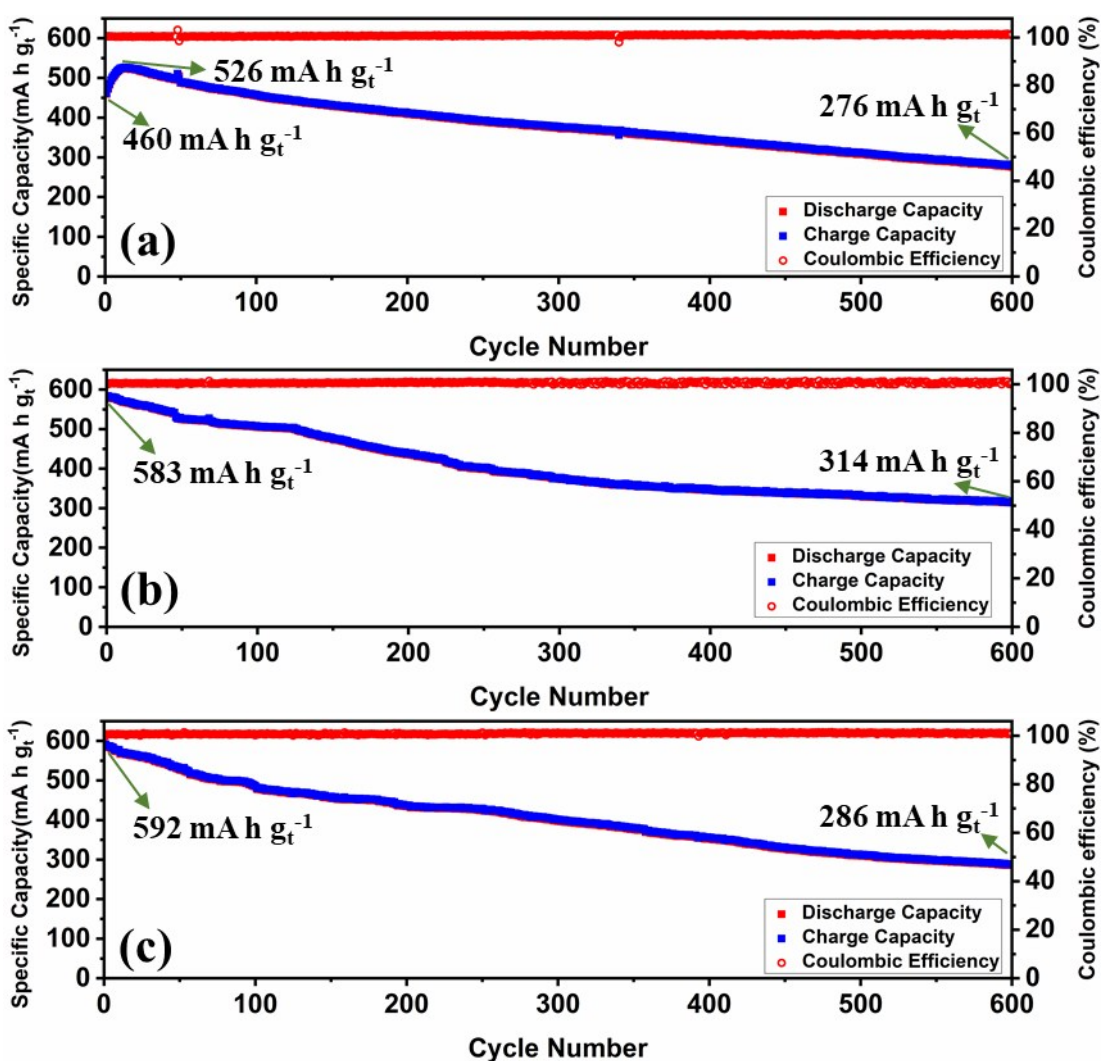


Fig.S7. Cycling performance and coulombic efficiency of (a) HrGO/S-1, (b) HrGO/S-2, and (c) HrGO/S-3 based on the total mass of the cathode materials at the current rate of 2 C over 600 cycles.