Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Strong Intermolecular Polarization to Boost Polysulfides Conversion Kinetics for High Performance Lithium-Sulfur Battery

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[1] Yin Hu, Anjun Hu and Jianwei Wang contribute equally to this work.

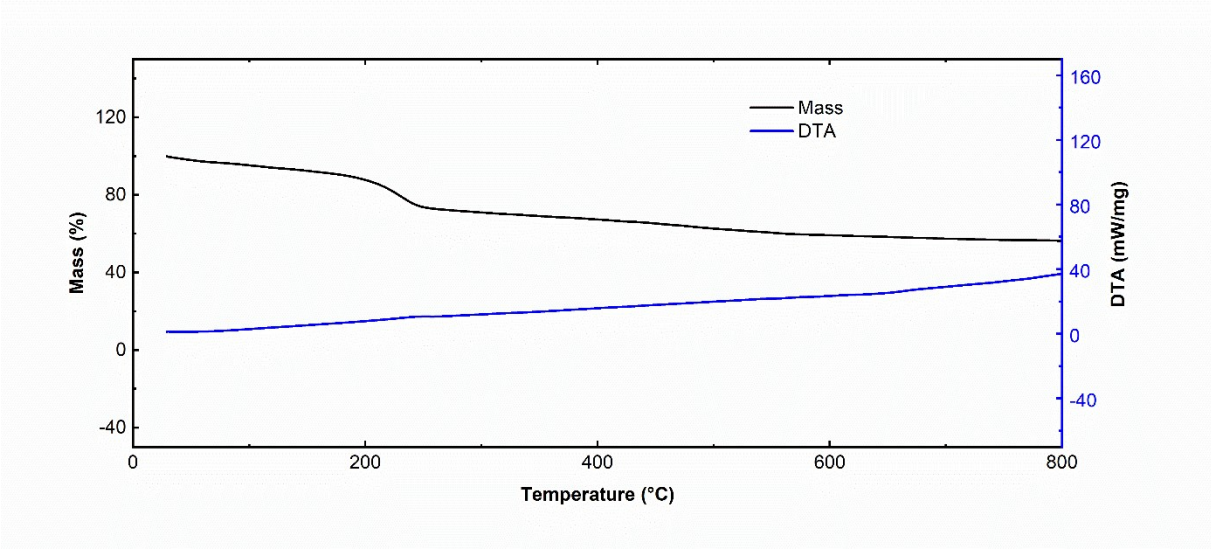

Fig. S1 TGA curve of CIS0 under N_2.

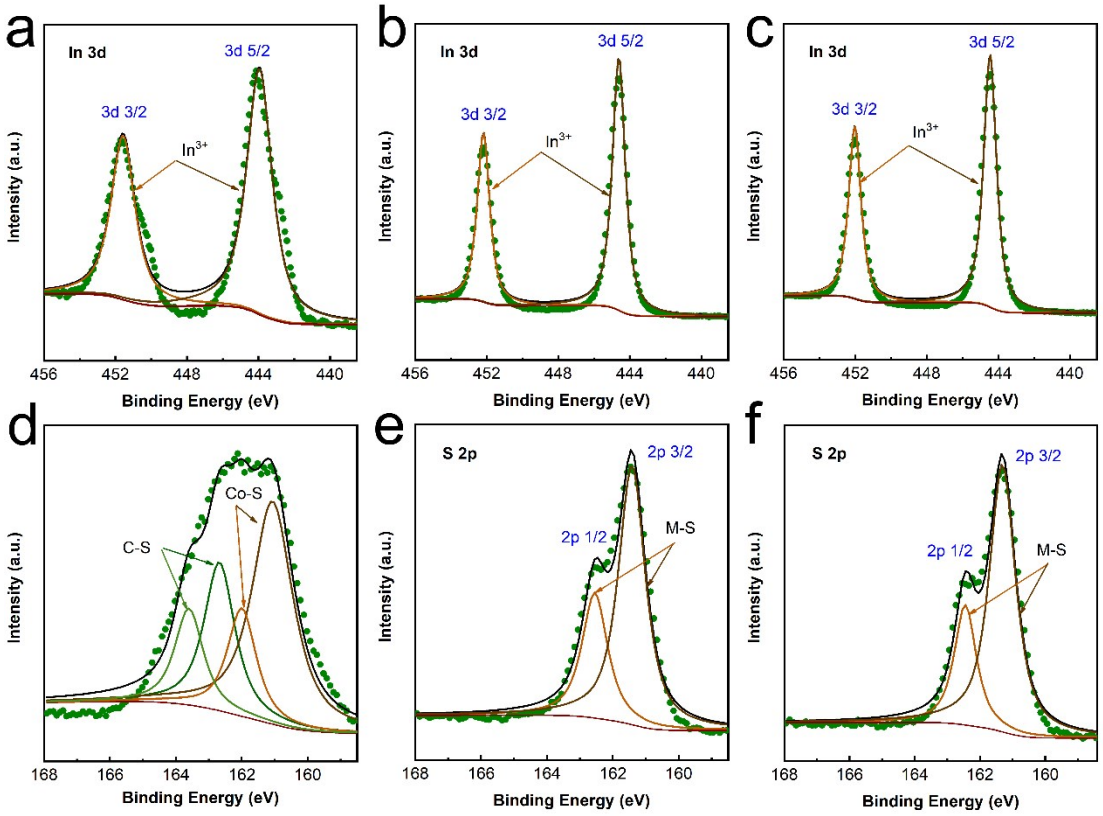

Fig. S2 XPS In 3d (a-c) and S2p (d-e) spectra of a,d) CIS0, b,e) CIS400 and c,e) CIS600, respectively.

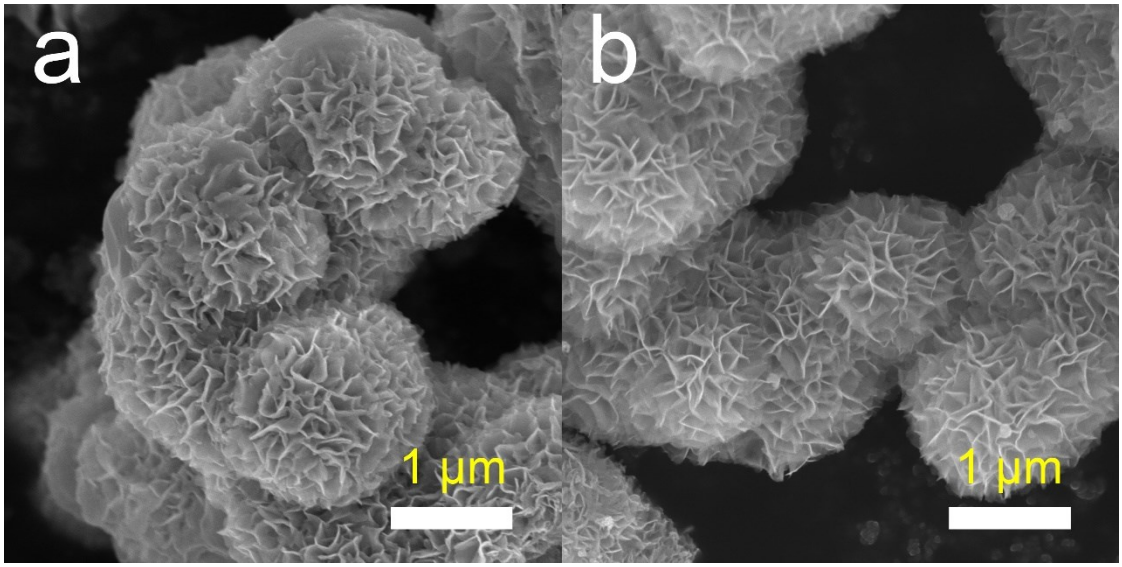

Fig. S3 SEM images of a) CIS400 and b) CIS0.

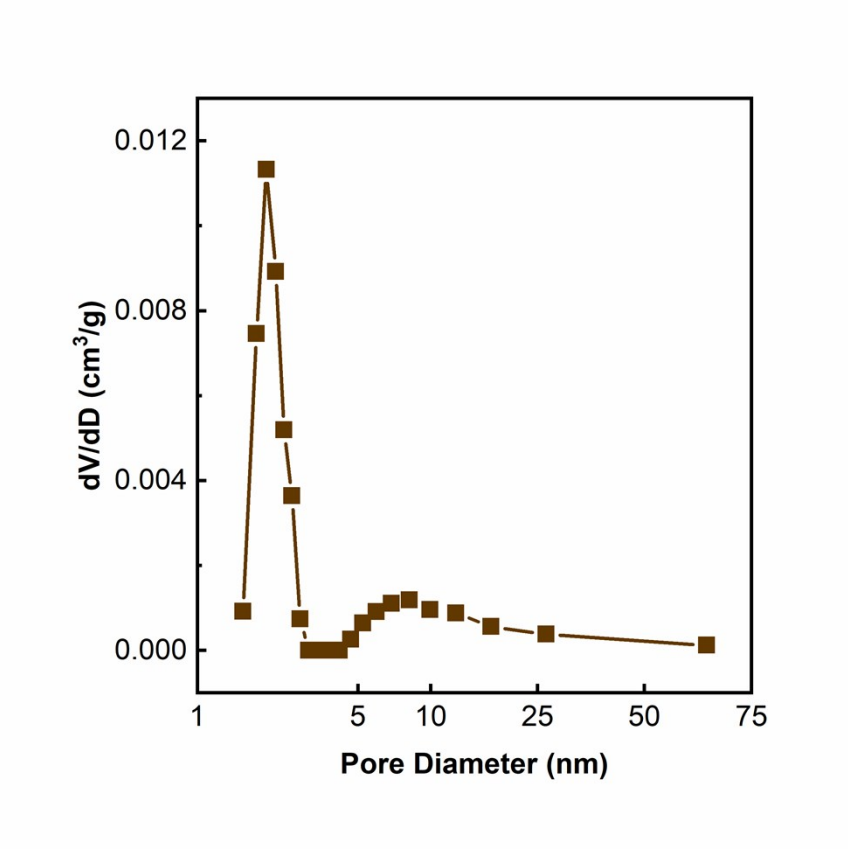

Fig. S4 Pore distribution curve of CIS0.

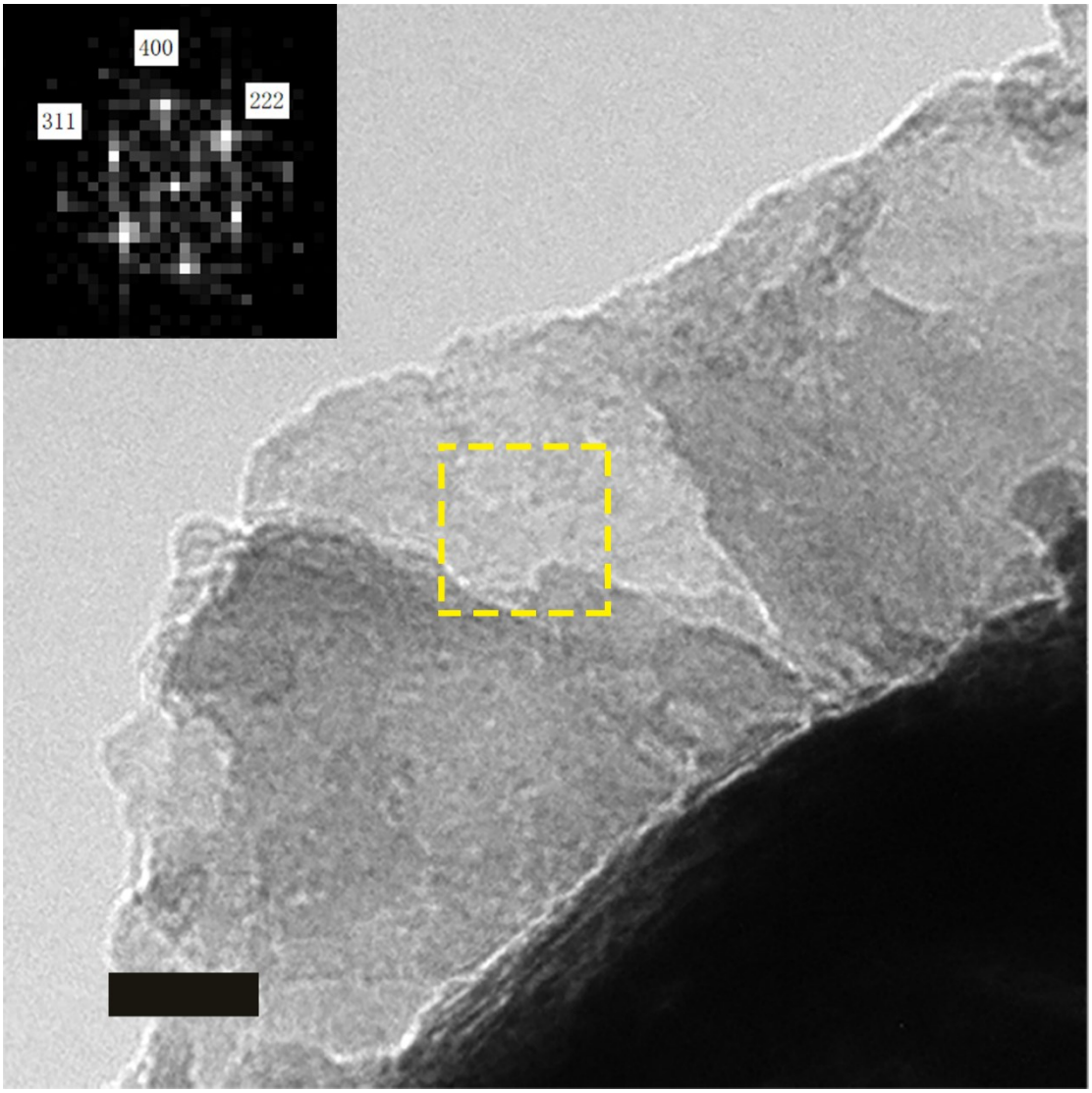

Fig. S5 TEM image locating at the edge of CIS600. Inset is the corresponding FFT pattern. Scale bar is 20 nm.

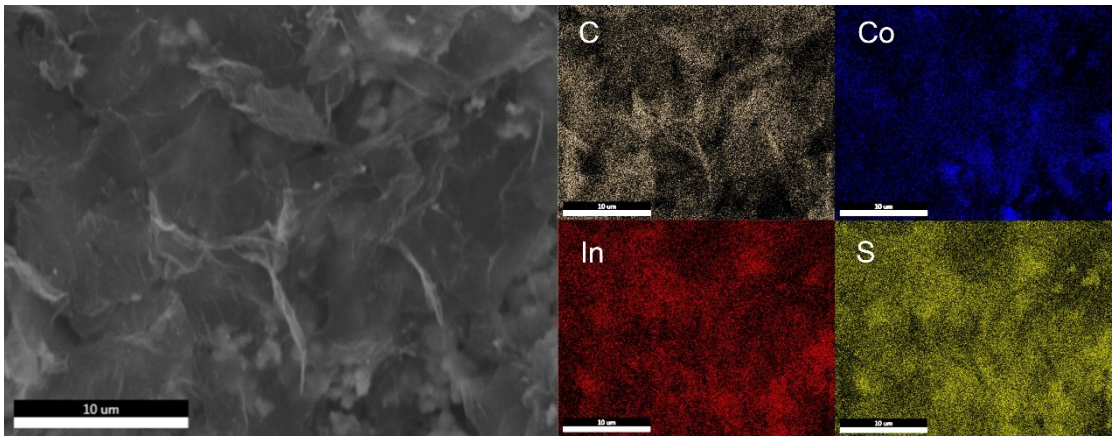

Fig. S6 EDS mapping of the selected area for the CIS600/RGO coated separator.

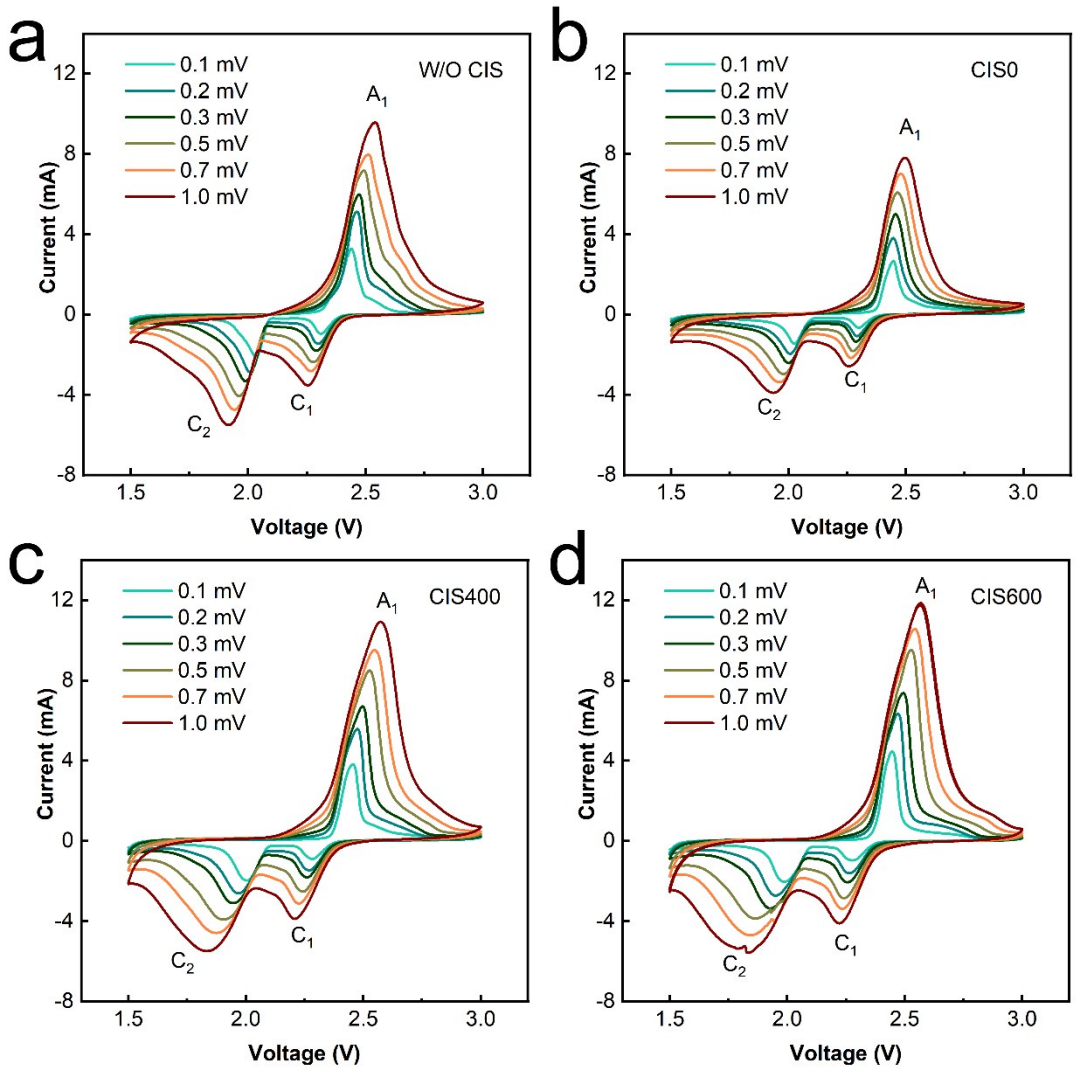

Fig. S7 CV measurements performed at different scan rates for the Li-S batteries a) without CIS, with b) CIS0, c) CIS400 and d) CIS 600.

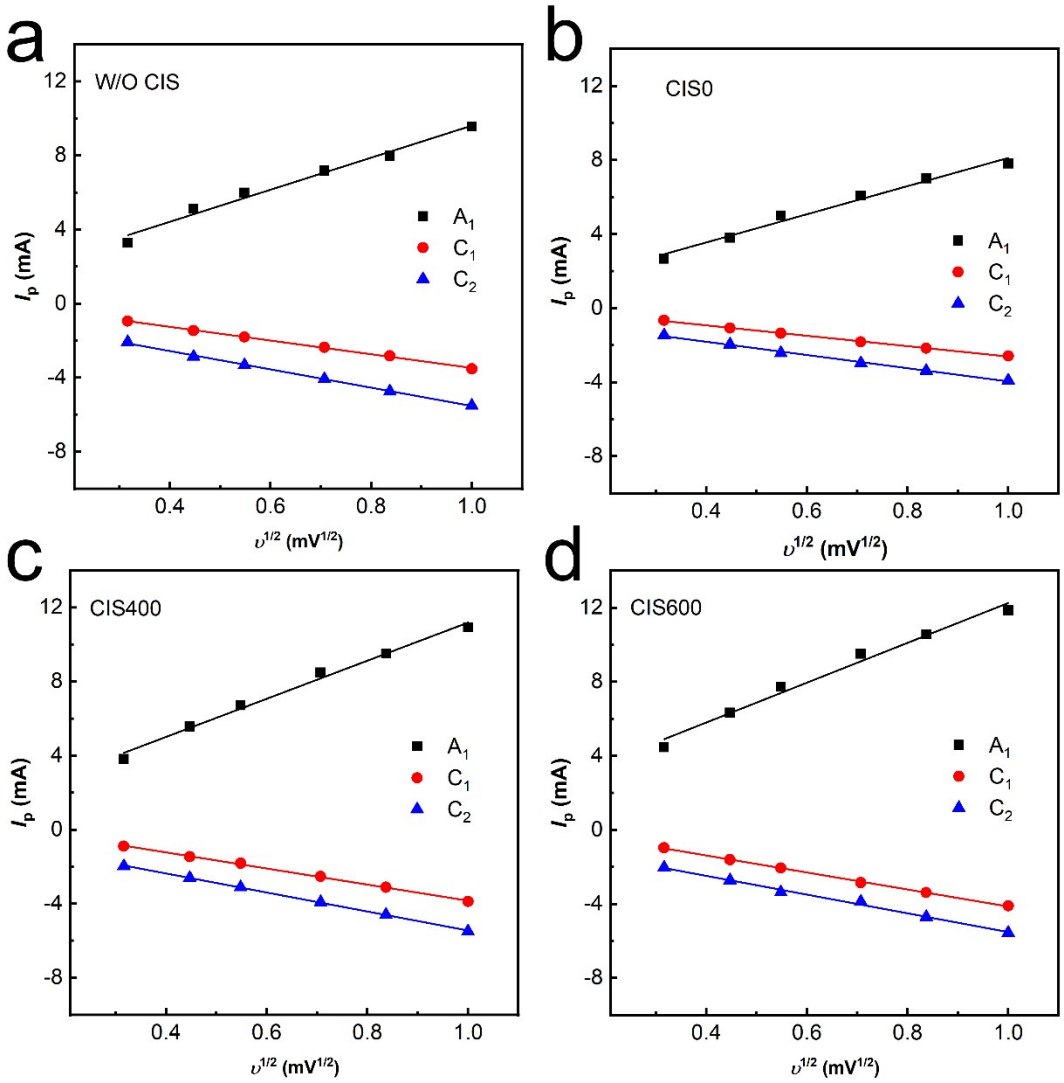

Fig. S8 The peak intensities of the CV curves obtained at different scan rates for Li-S batteries a) without CIS and with b) CIS0, c) CIS400, d) CIS600.

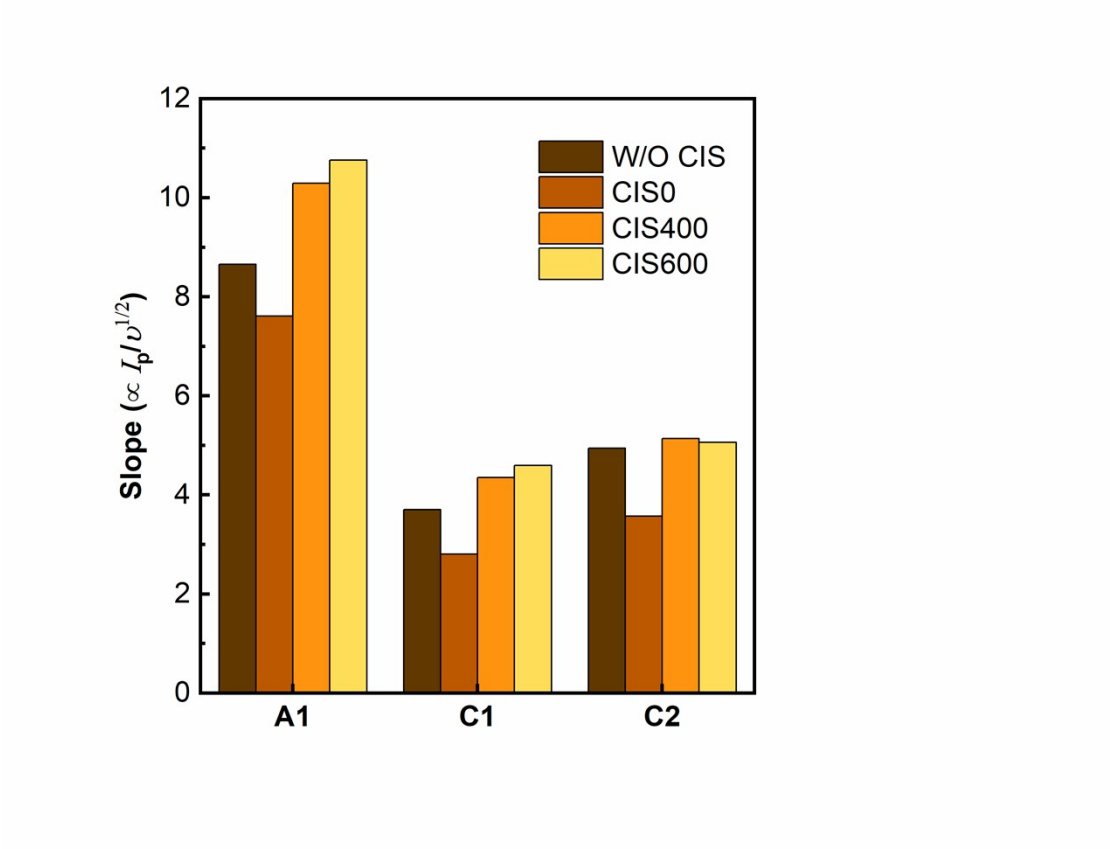

Fig. S9 The linear fitting slopes from the peak intensities of the Li-S batteries at different CV scan rates.

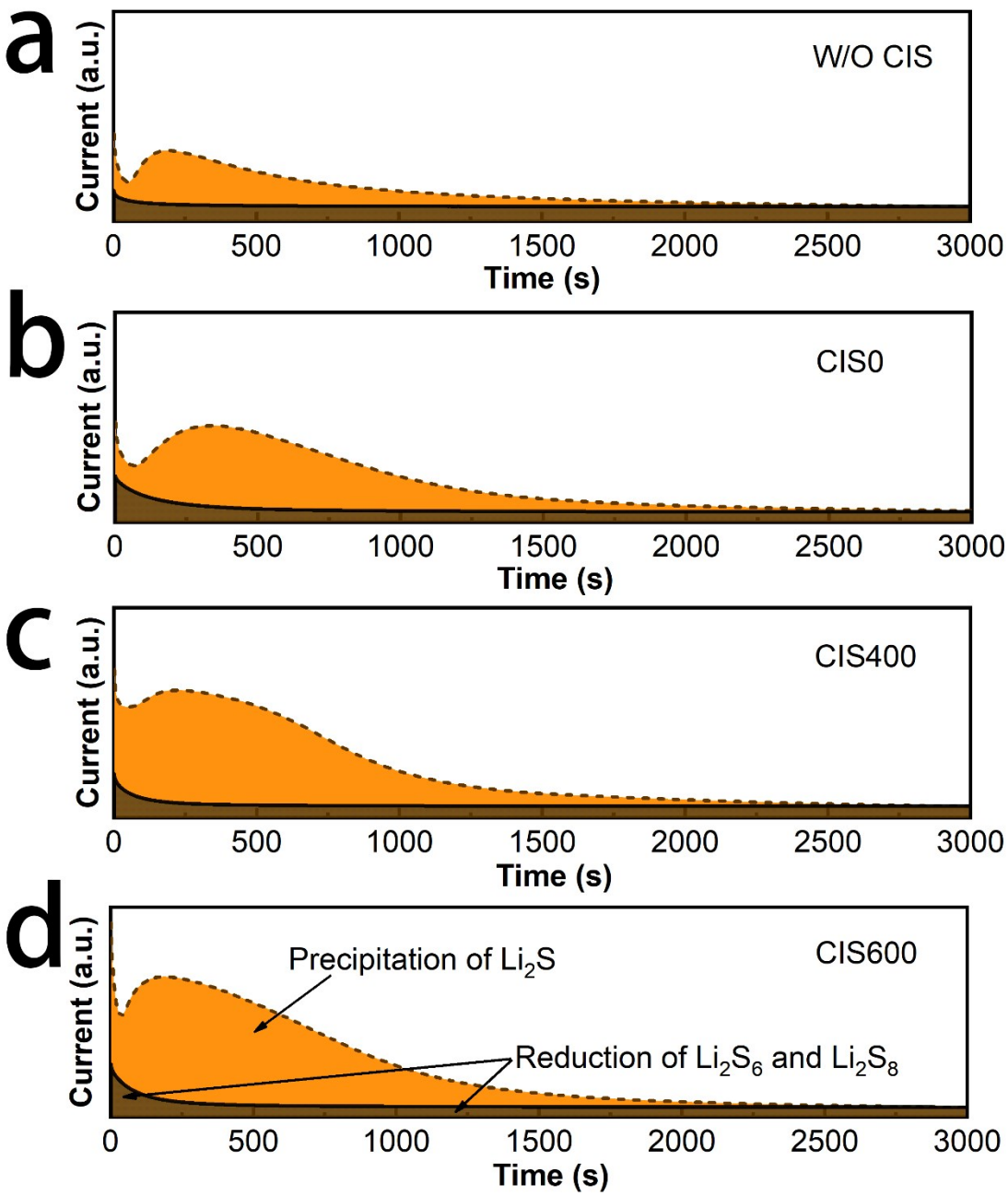

Fig. S10 Polysulfides deposition profiles. The dark areas represent the reduction of Li_2S_8 and Li_2S_6, which are obtained by potential-static discharging at 2.15 V until the current reduces to less than 1% of the initial current. The light areas are assigned to the deposition of Li_2S, which are measured by potential-static discharging at 2.06 V, followed by subtracting the contribution from the reduction of Li_2S_8 and Li_2S_6.

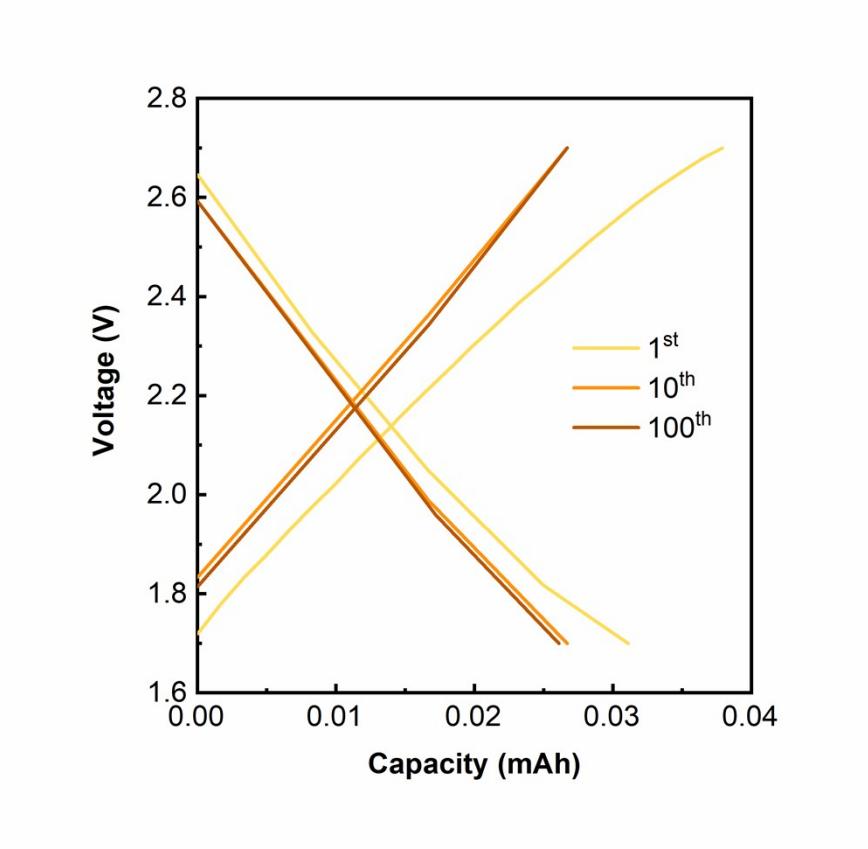

Fig. S11 Voltage profiles of the battery without sulfur.

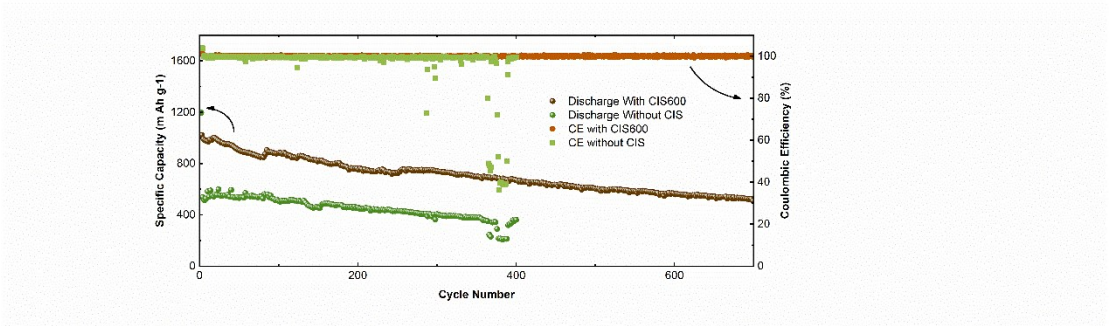

Fig. S12 Cycling performance of the batteries with and without CIS600.

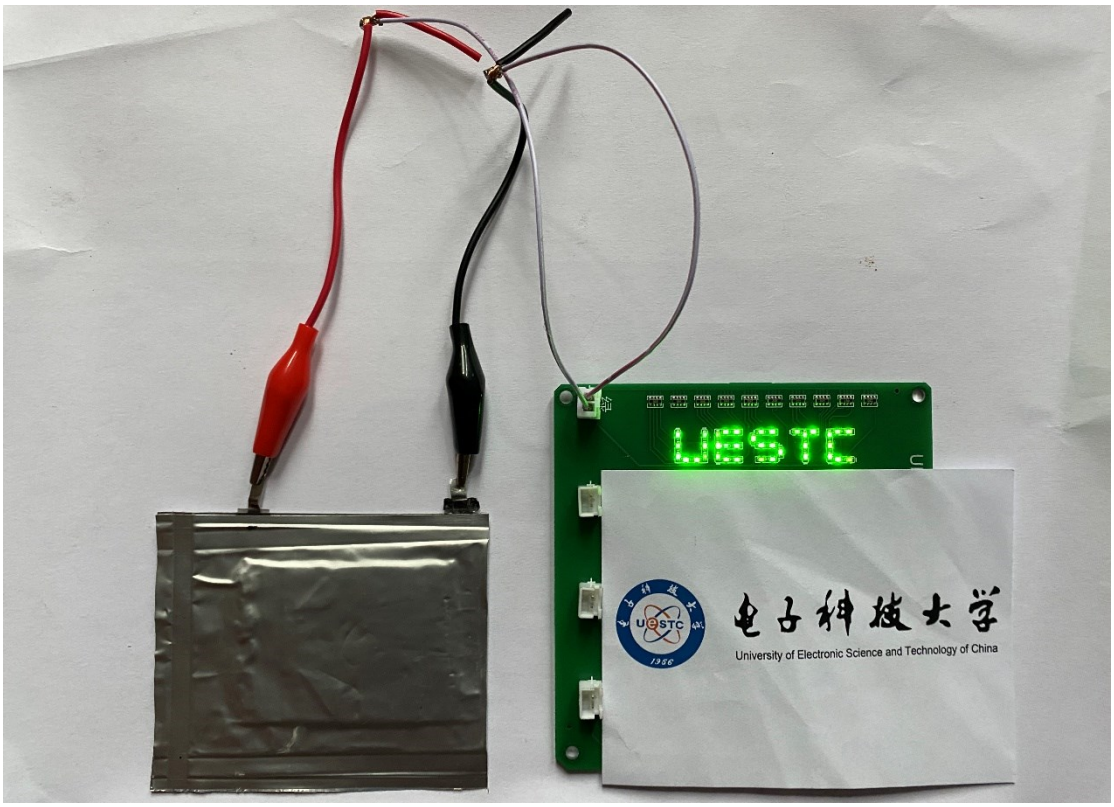

Fig. S13 Li-S punch cell powering a LED panel.

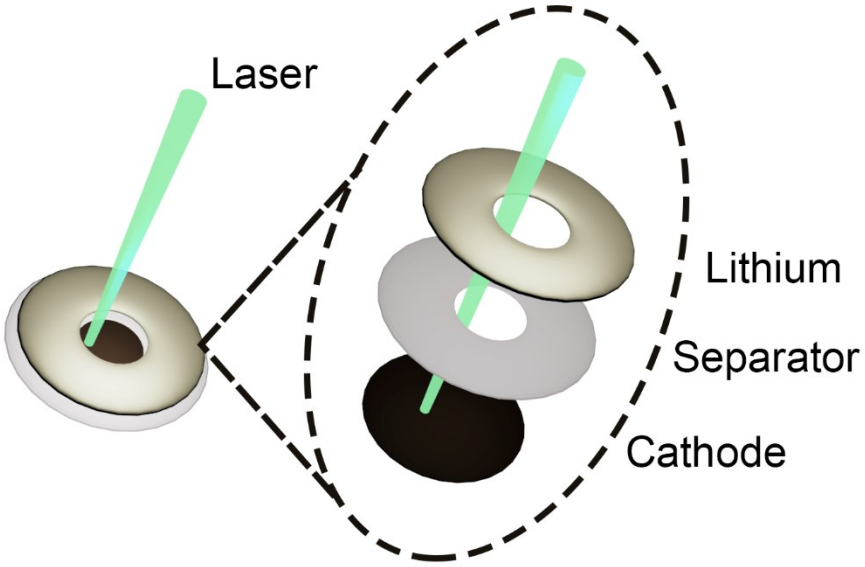

Fig. S14 Illustration of the in-situ cell configuration.

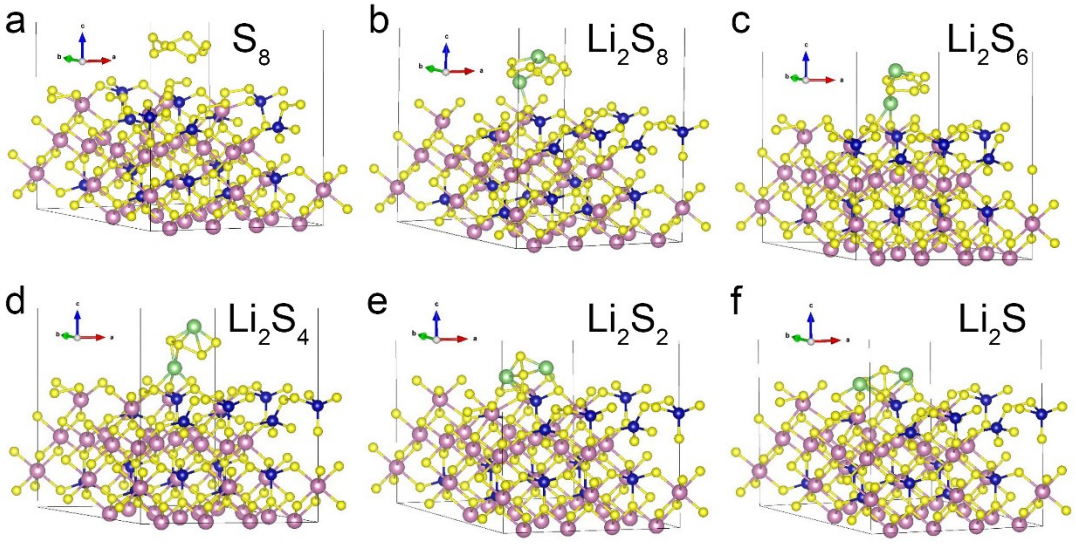

Fig. S15 Optimized Configurations of LiPSs on the surface of CIS.

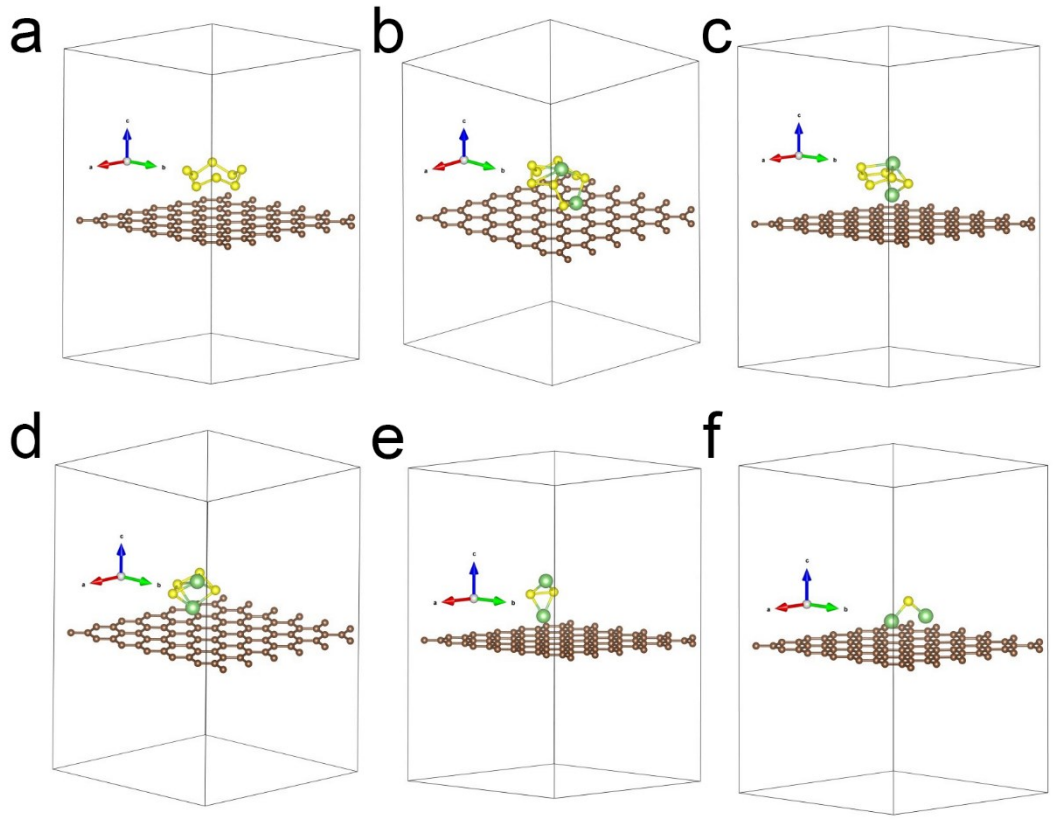

Fig. S16 The optimized configurations of LiPSs on Graphene.

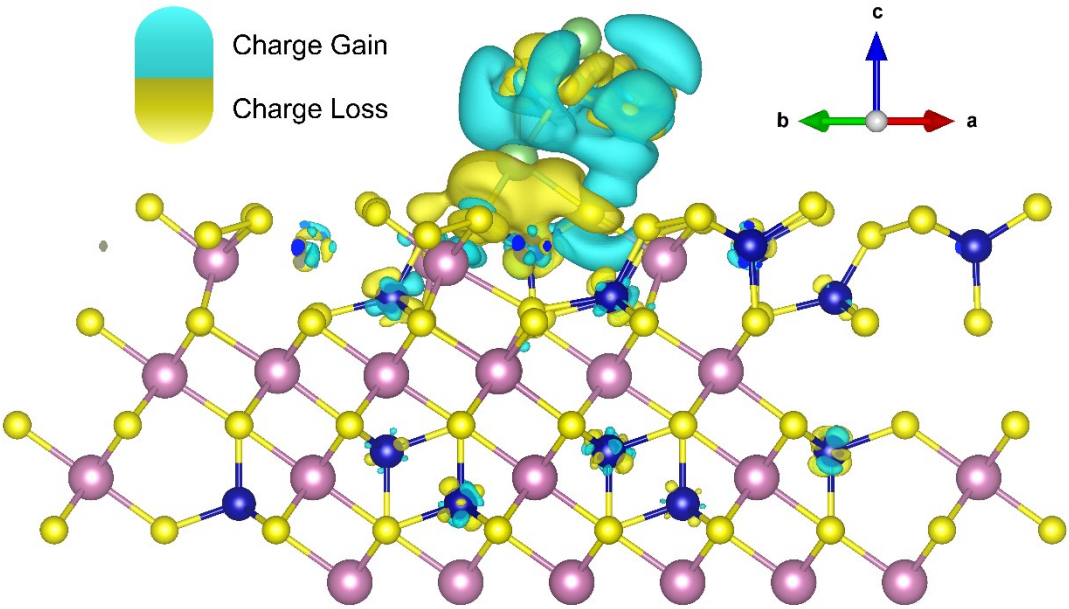

Fig. S17 Charge density difference analysis of Li_2S_4 on CIS considering magnetism.

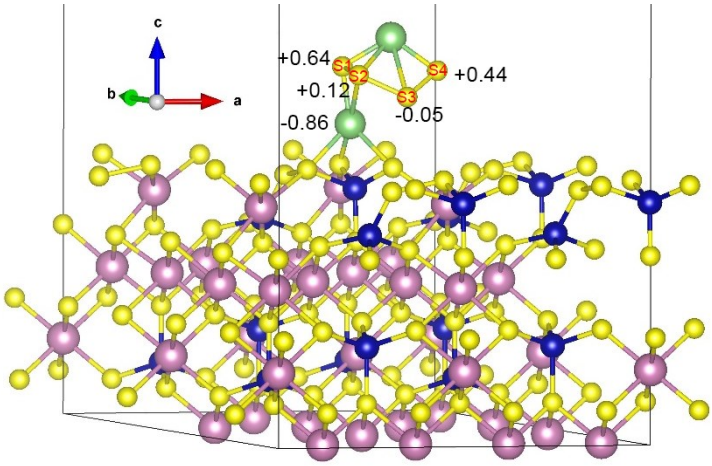

Fig. S18 Bader charge analysis of Li_2S_4 on the surface of CIS.

Table S1 Summary of the XPS peak fitting results.

	Co2p (eV)				In3d (eV)				S2p (eV)		
	CIS0	CIS400	CIS600		CIS0	CIS400	CIS600		CIS0	CIS400	CIS600
P1	801.7	803	803.2	P1	451.6	452.6	452	P1	163.7	162.6	162.4
P2	795.8	799.6	800	P2	443.9	444.7	444.4	P2	162.7	161.5	161.3
P3	793.7	795.2	795					P3	161.8		
P4	786.3	787.5	787					P4	160.9		
P5	782.3	784.2	784.3								
P6	778.6	779.6	779.5								