Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Ionic Liquid-Assisted Thermal Decomposition Synthesis of Carbon Dots and Graphene-like Carbon Sheets for Optoelectronic Application

Jia-Yun Wan, Ze Yang, Zhong-Guo Liu and Hang-Xing Wang*

Supporting Figures

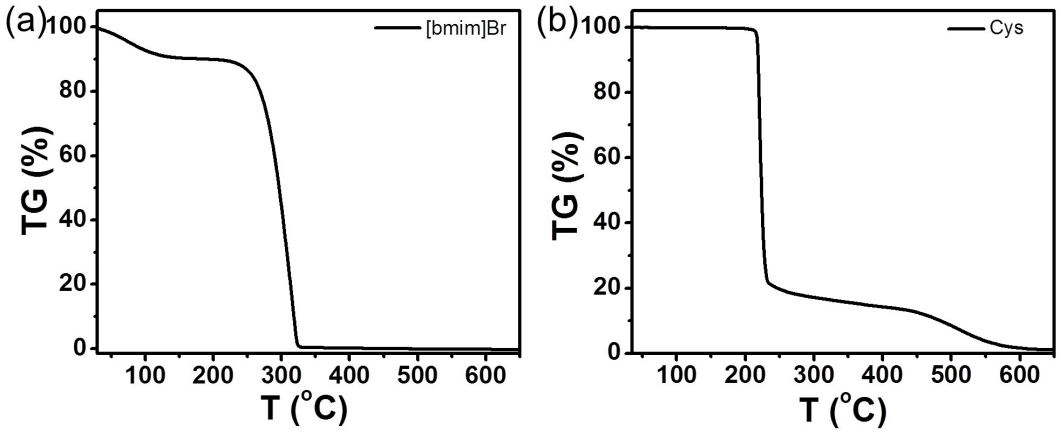


Figure S1. The thermo gravimetry analysis (TGA) curves of (a) [bmim]Br and (b) L-cys, which give the optimal reaction temperature range for the preparation.

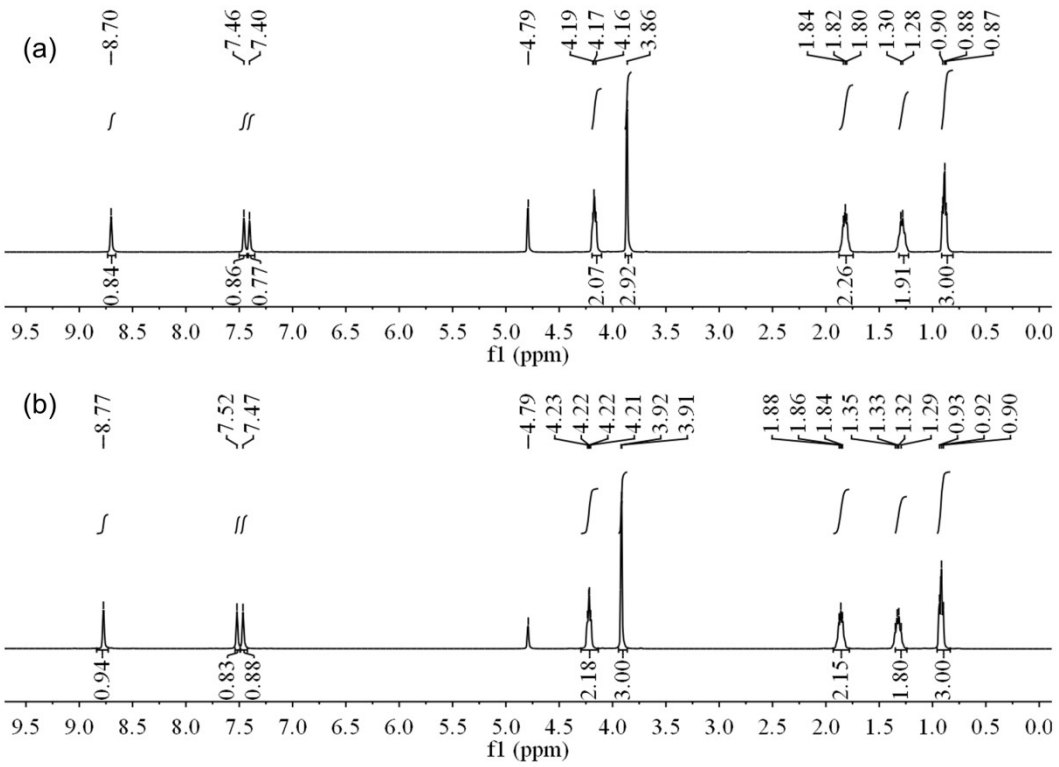


Figure S2. ^{1}H NMR (400 MHz, D_2O) spectra of 1-butyl 3-methyl imidazolium bromide before (a) and after (b) heating treatment at 240 ^{o}C for 120 minutes.

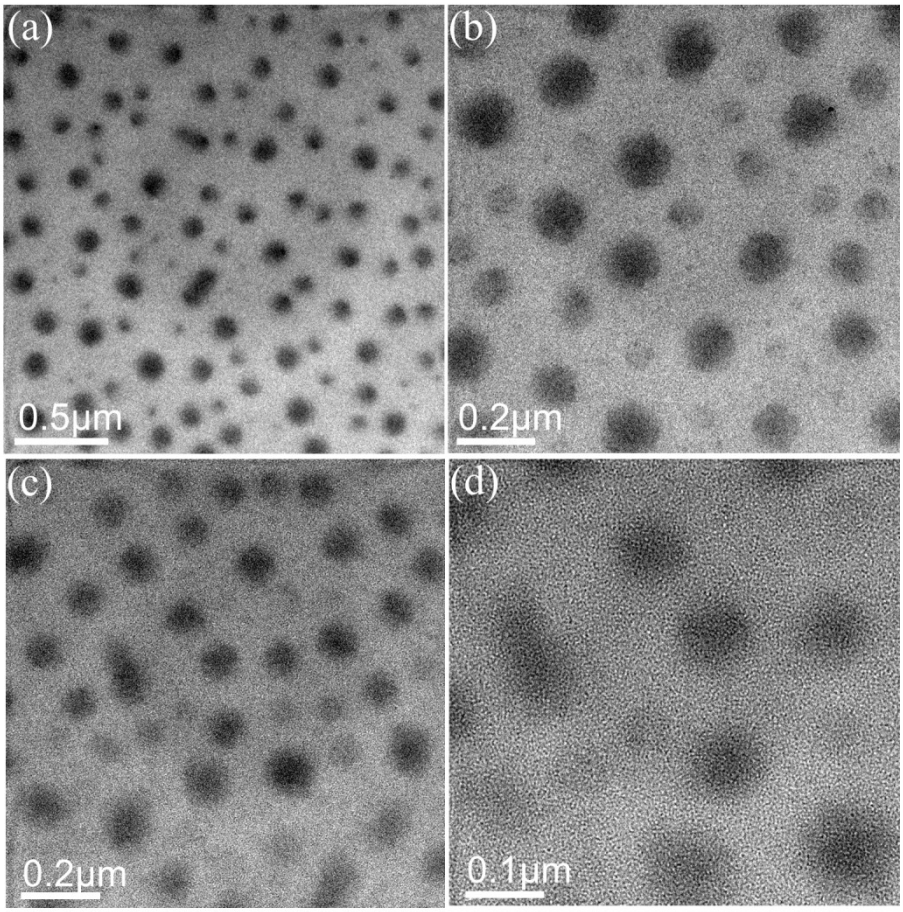


Figure S3. TEM images of the as-prepared CD with using L-cys as precursor. The sample was prepared by thermal decomposition of L-cys at 240 ^{o}C for 30 min and then purified by column chromatography.

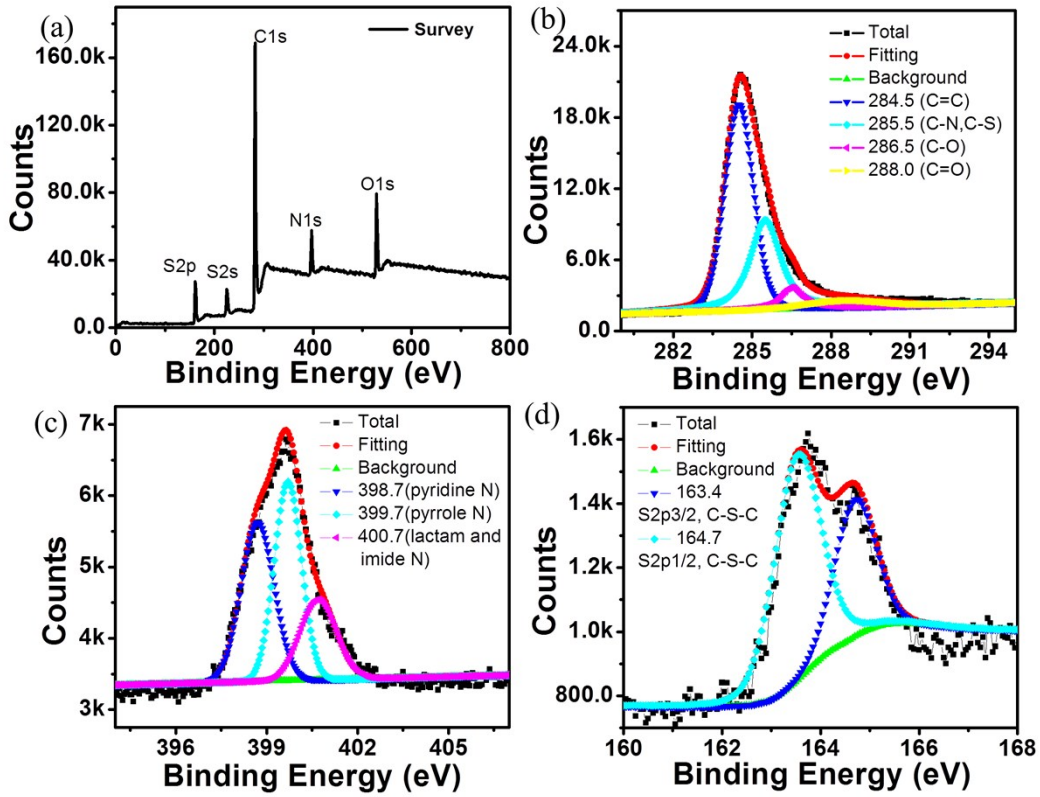


Figure S4. (a) XPS survey spectrum of flake structural CS that is prepared from L-cys. (b-d) High-resolution (b) C1s, (c) N1s, and (d) S_{2p} peaks of CD. The sample was prepared by thermal decomposition of L-cys at 240 ^{o}C for 30 min and then purified by column chromatography.

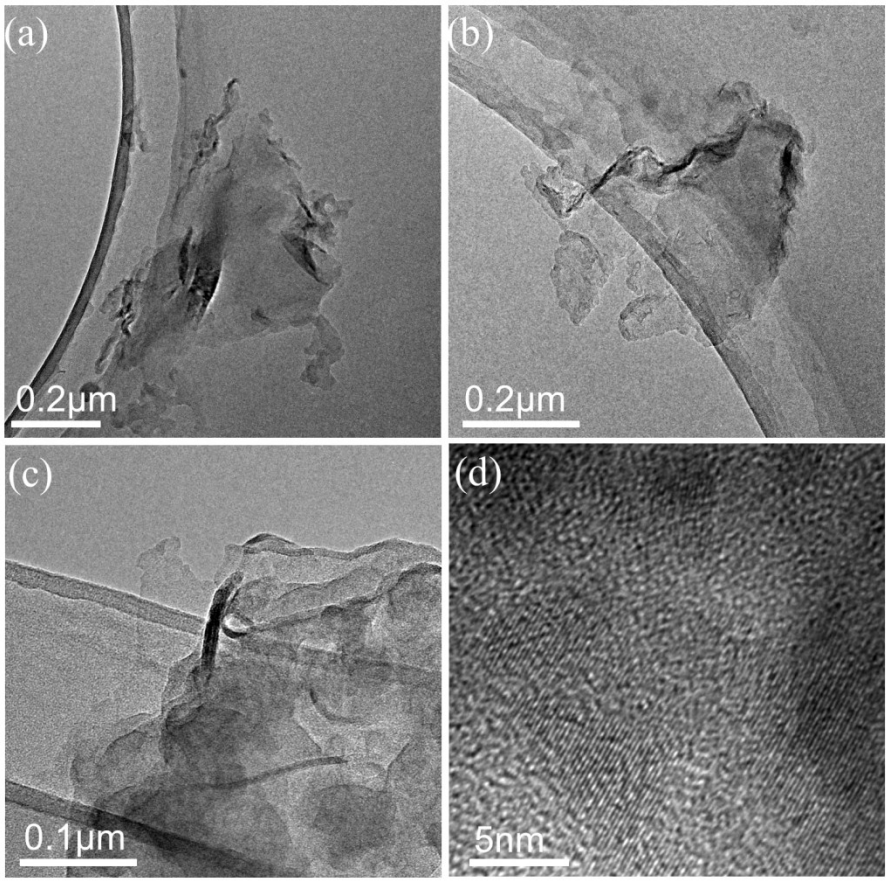


Figure S5. TEM images of the as-prepared CS with using L-cys as precursor. The sample was prepared by thermal decomposition of L-cys at 240 ^{o}C for 30 min and then purified by filtration.

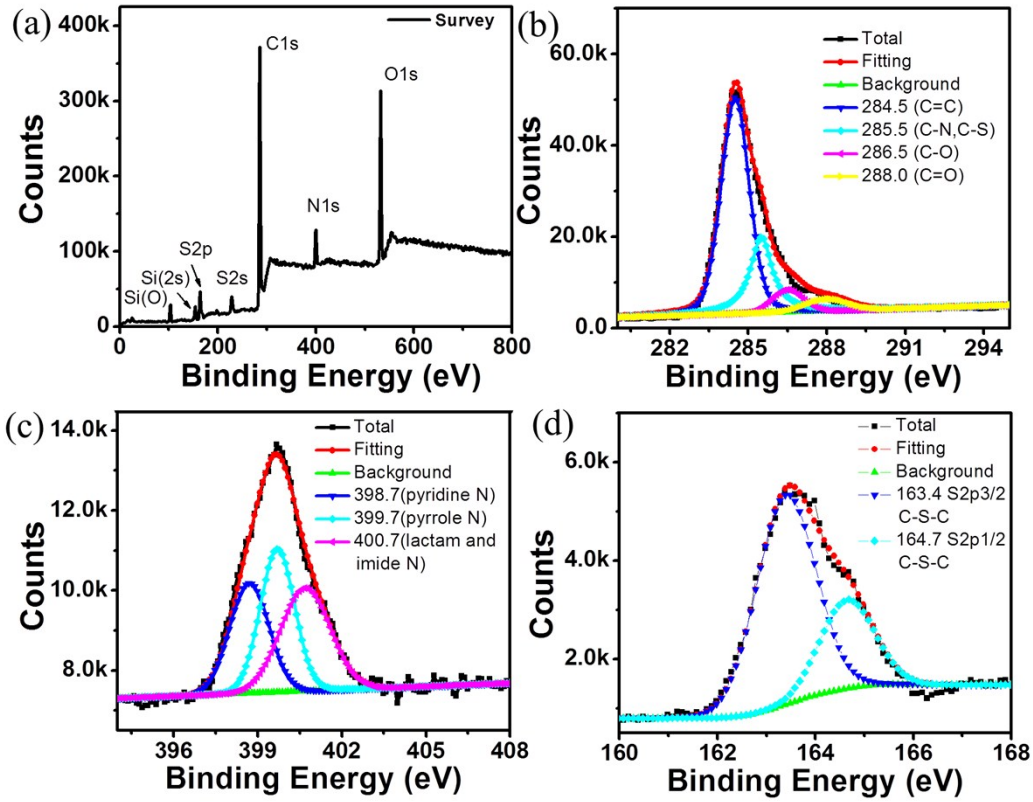


Figure S6. (a) XPS survey spectrum of flake structural CS that is prepared from L-cys. (b-d) High-resolution (b) C_{1s}, (c) N_{1s}, and (d) S_{2p} peaks of CS. The sample was prepared by thermal decomposition of L-cys at 240 ^{o}C for 30 min and then purified by filtration.

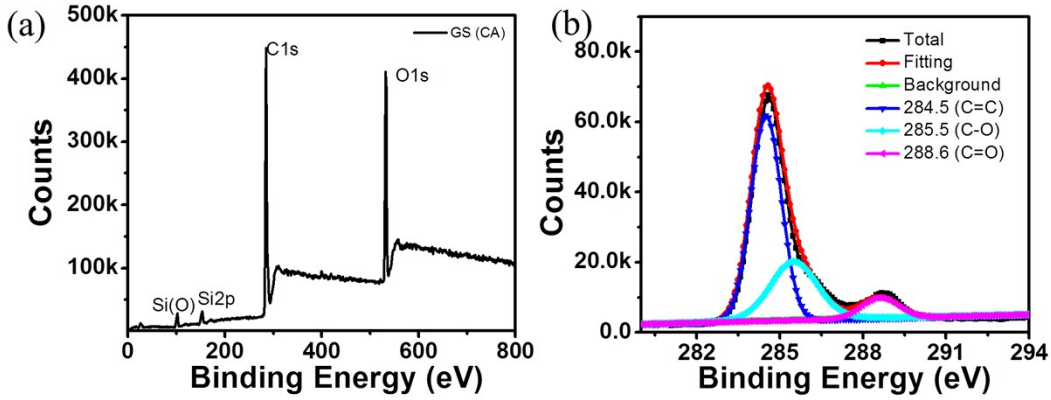


Figure S7. XPS survey spectrum (a) and the deconvolution of C_{1s} spectrum (b) of the prepared CS with using citric acid as precursor. The sample was prepared by thermal decomposition of citric acid at 210 ^{o}C for 30 min and then purified by filtration.

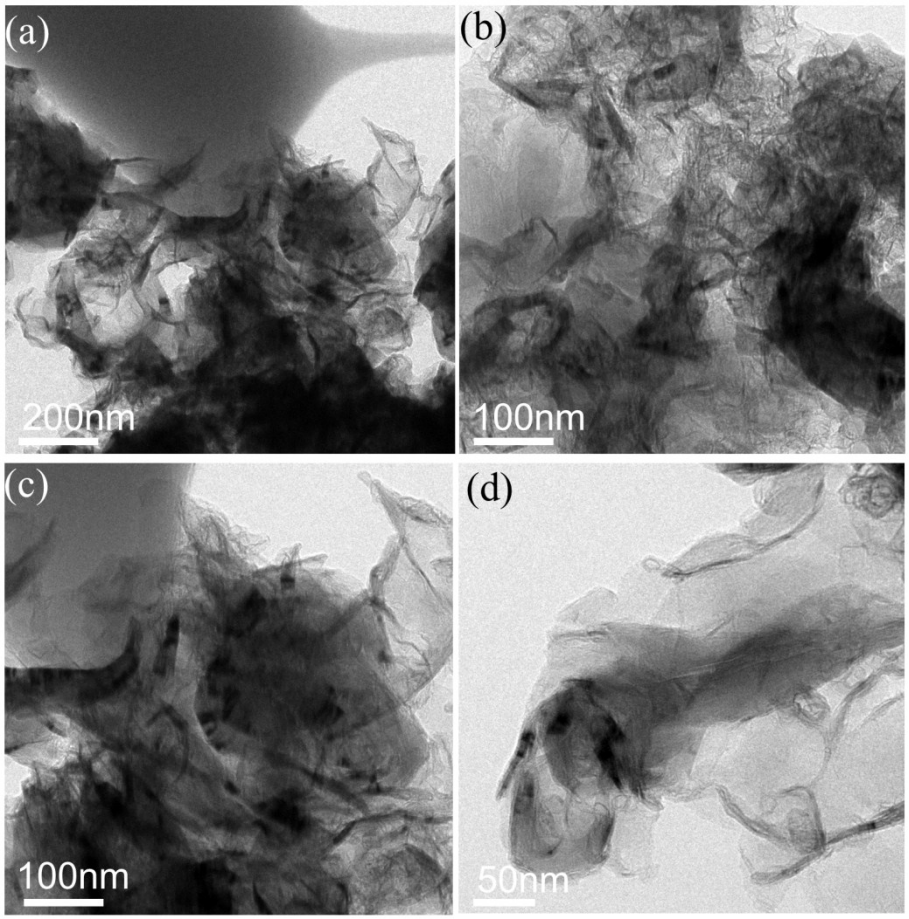


Figure S8. TEM images of the as-prepared CS with using citric acid as precursor. The sample was prepared by thermal decomposition of citric acid at 210 ^{o}C for 30 min and then purified by filtration.

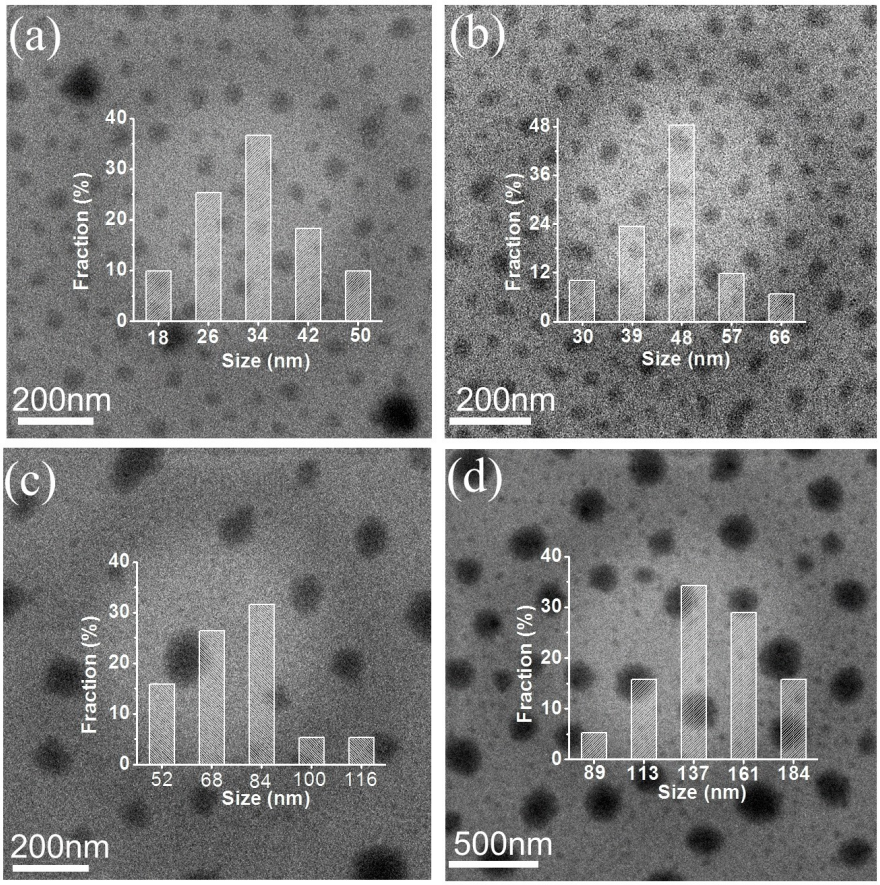


Figure S9. TEM images for CD prepared by thermal decomposition of L-cys at 240 ^{o}C with duration time of 5 min, 10 min, 30 min and 60 min, respectively.

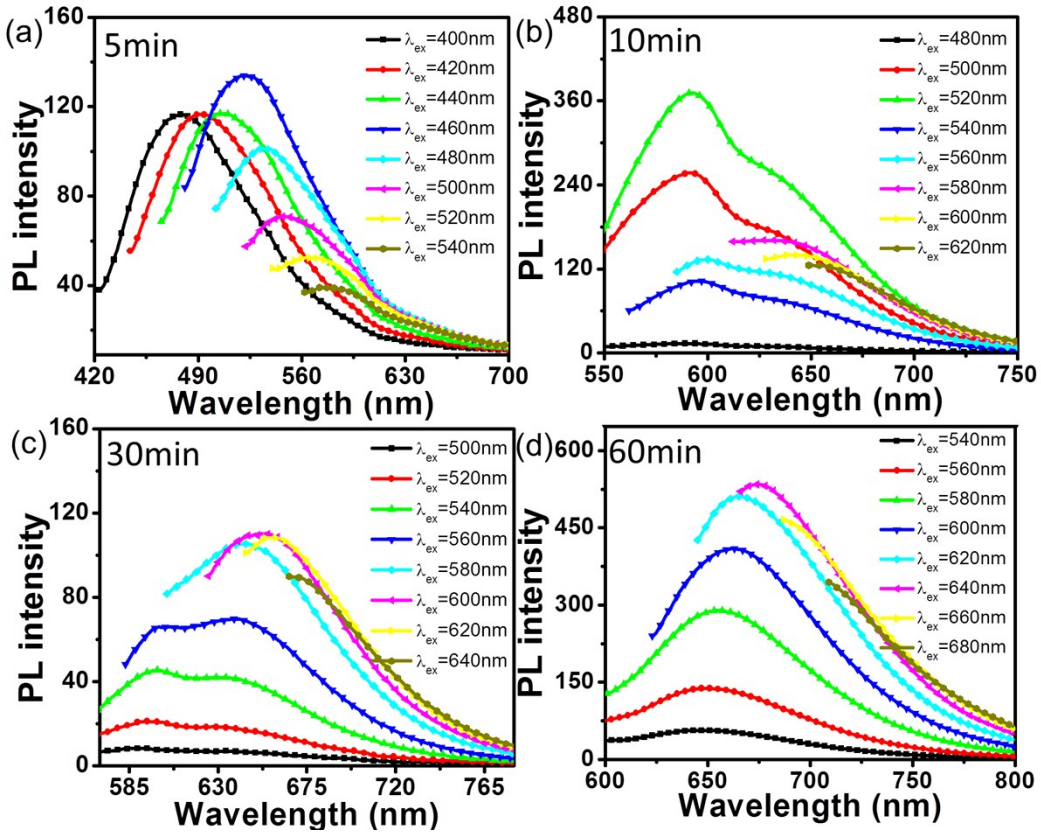
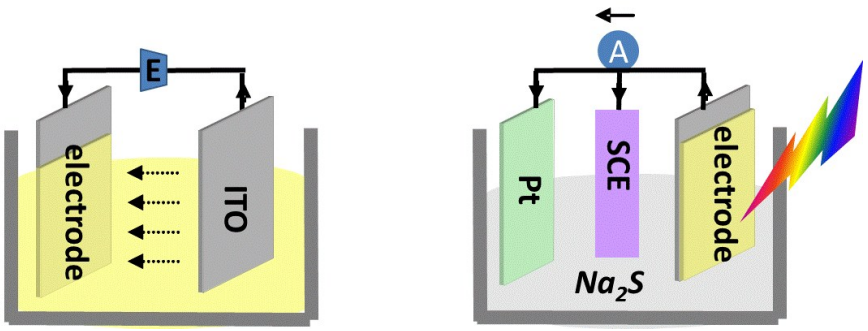


Figure S10. PL spectra for samples thermal decomposition prepared at 240 °C for different durations (5 min, 10 min, 30 min and 60 min). All the samples were dispersed in EtOH and without further treatment.



Scheme S1. (a) Illustration of the electro-deposition of CD, CS and CD/CS onto ITO substracts for preparation of photoelectrodes. (b) A PEC cell with three-electrode configuration was constructed in this work.

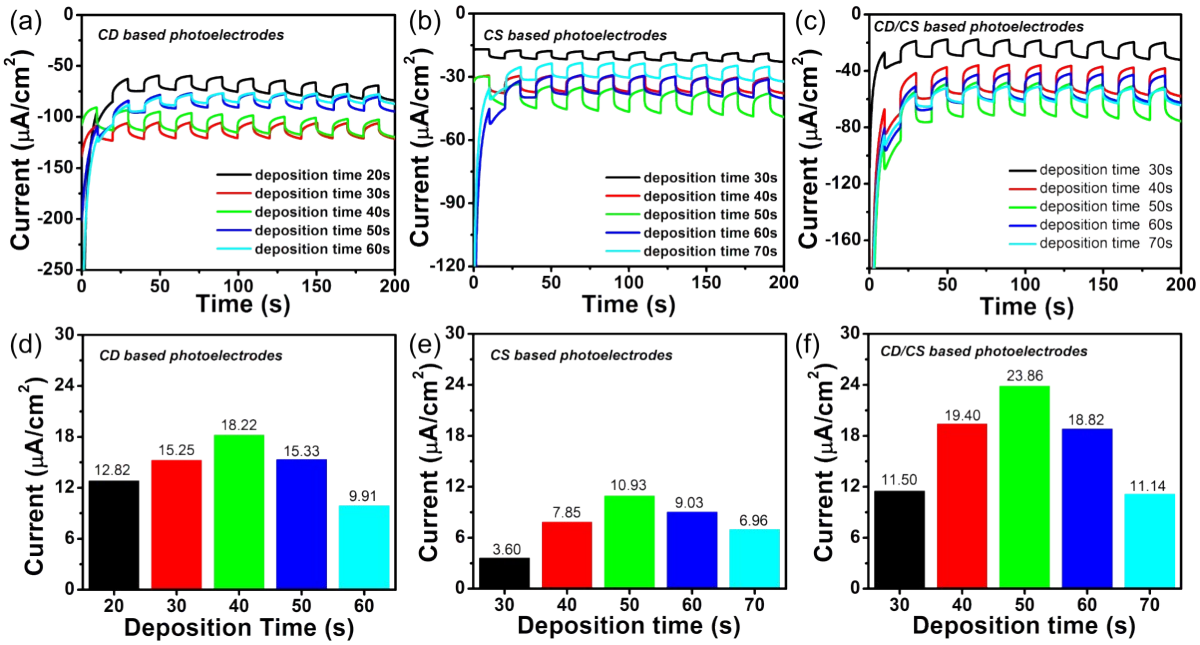


Figure S11. (a-c) Photogenerated current responses versus light on/off cycle time profiles of the (a) CD, (b) CS, and (c) CD/CS hybrid photoelectrodes, respectively. (d-f) Statistical graphs of photogenerated current of the (d) CD (d), (e) CS (e), (f) and CD/CS photoelectrodes, respectively.