Supporting Information for

Graphene quantum dots/L-cysteine coreactant electrochemiluminescence system and its application in sensing lead (II) ions

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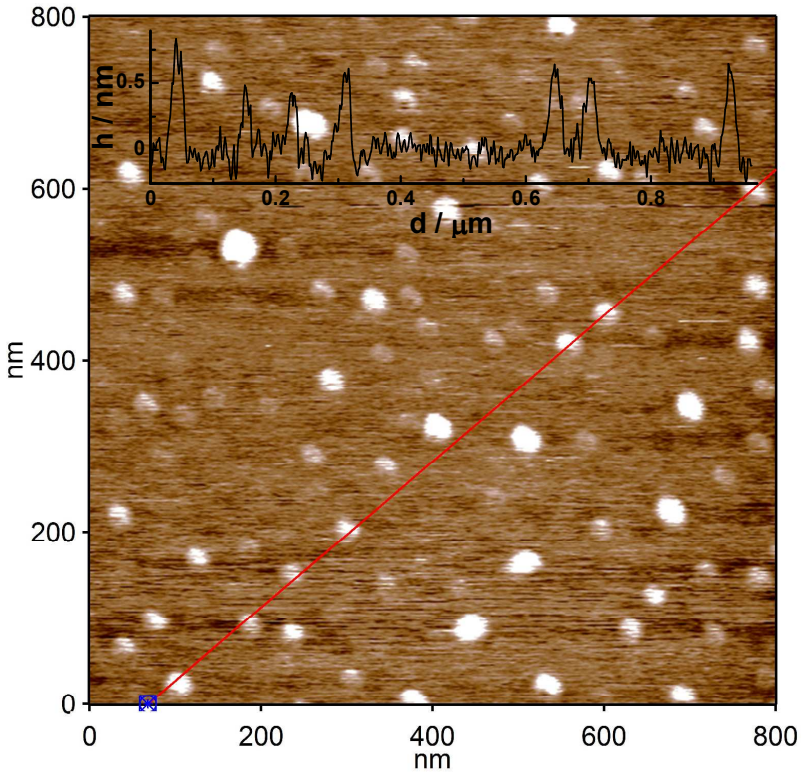

Figure S1. AFM image of the obtained GQDs. Inset is the height profile along the line in the AFM image.

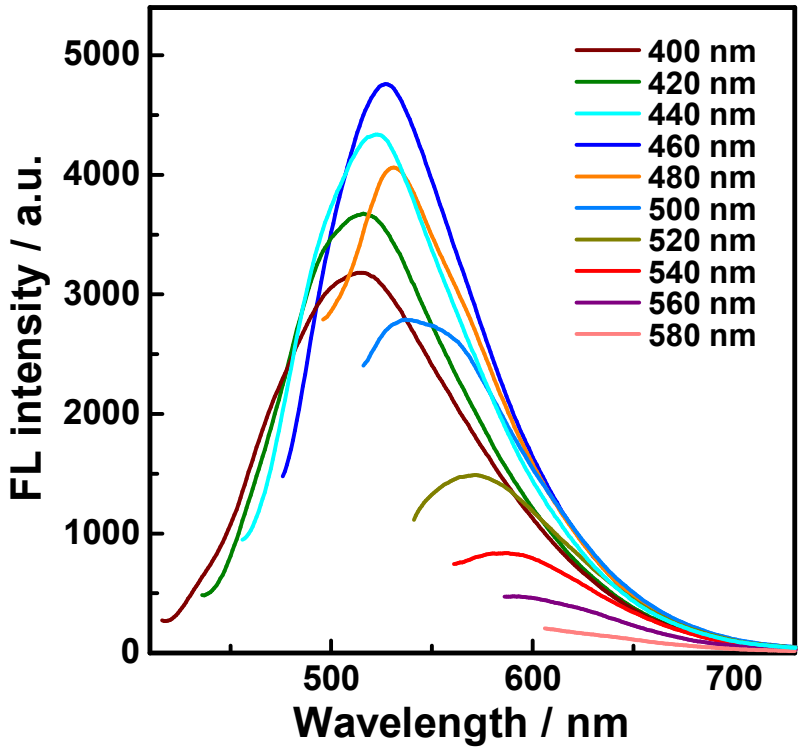

Figure S2. Fluorescence emission spectra (recorded for progressively increased excitation wavelengths in 20 nm increments) of the obtained GQDs in aqueous solution.

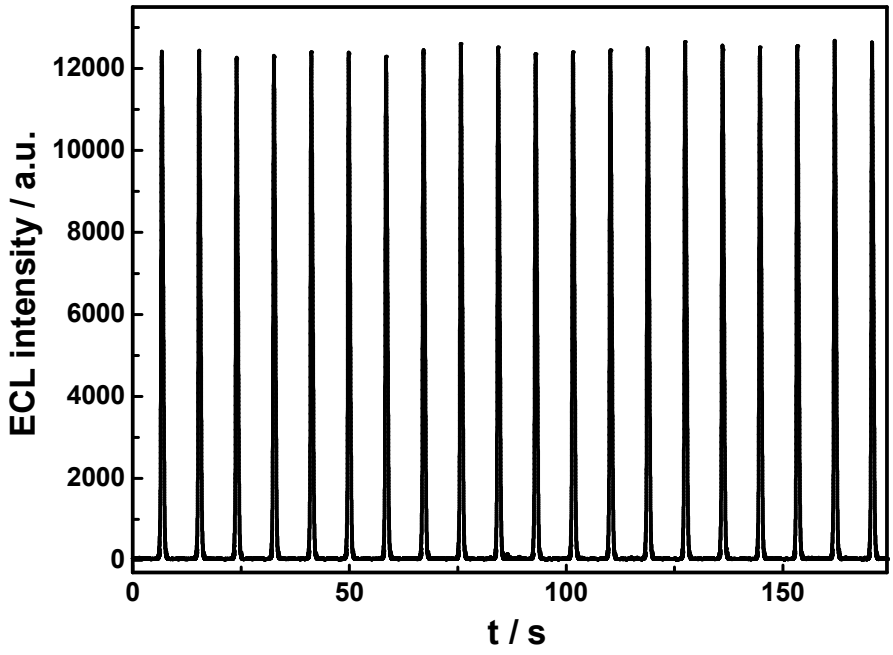

Figure S3. ECL responses of the GQD/L-Cys system obtained during a continuous potential scan between -1.10 and +1.50 V (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; scan rate: 0.6 V/s; pH value: 5).

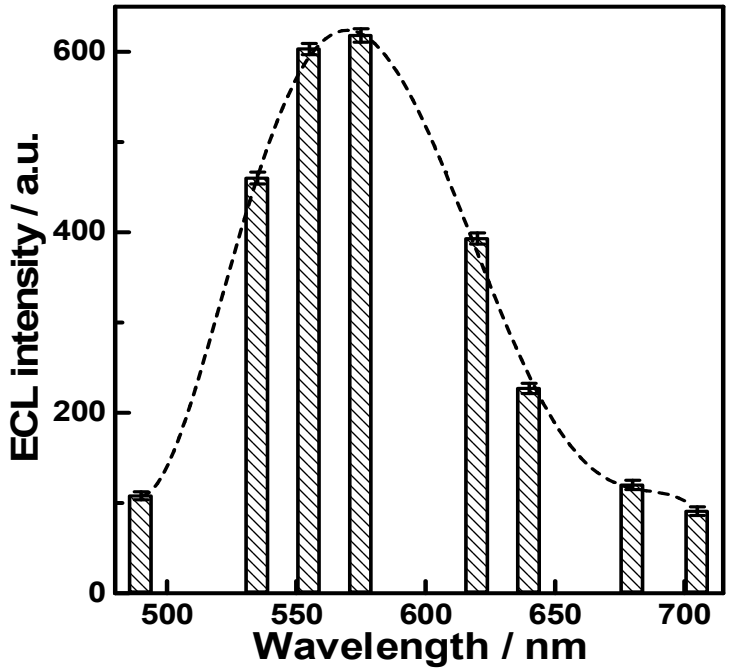

Figure S4. ECL spectrum for the GQD/L-Cys coreactant system (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; scan rate: 0.6 V/s; pH value: 5).

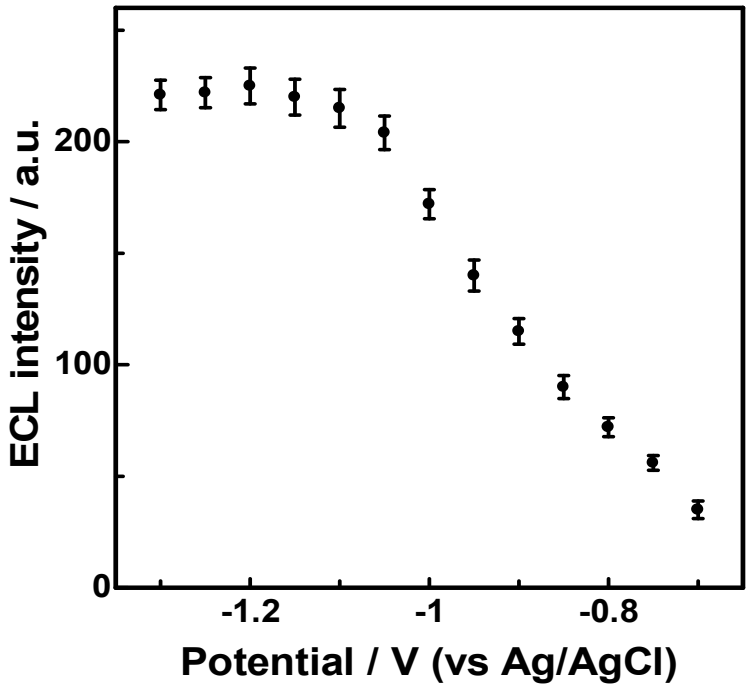

Figure S5. Effect of negative potential on the ECL transients of GQDs. In the experiments, 1 Hz potential steps between +1.8 V and a given negative potential were applied. Thus then, the ECL intensity was dependent on the given negative potential, which affected the reduction efficiency of GQDs.

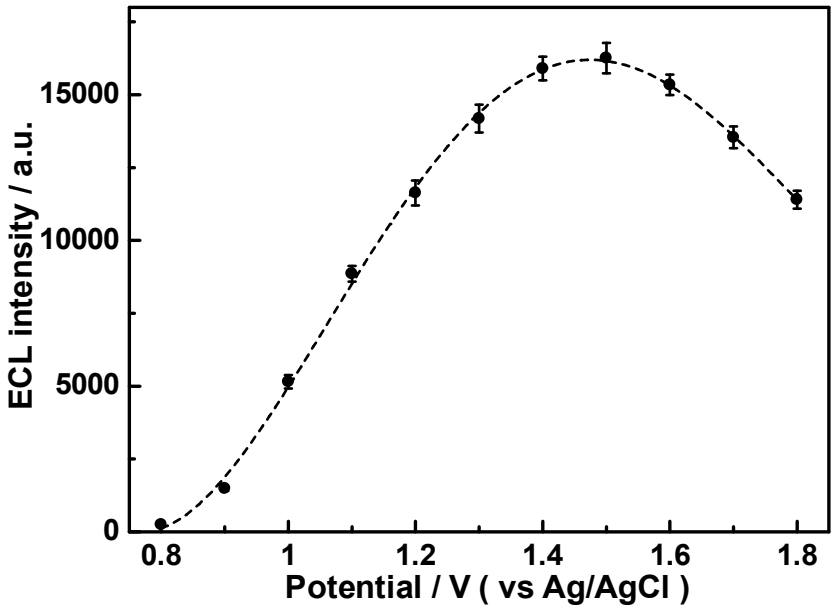

Figure S6. Effect of upper limit of potential window on the ECL intensity of the GQD/L-Cys coreactant system (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; scan rate: 0.6 V/s; pH value: 5).

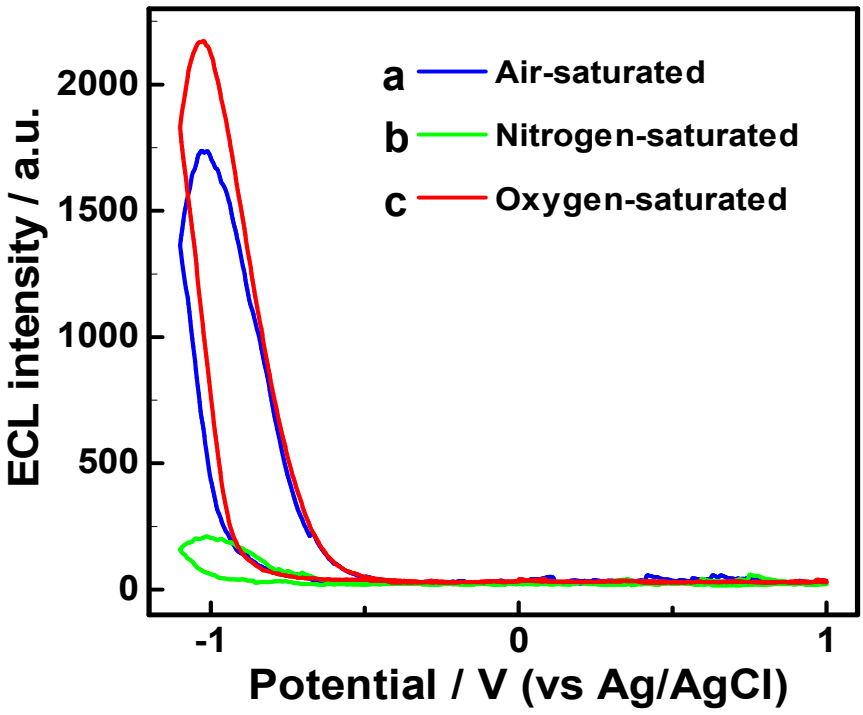

Figure S7. ECL potential curves of the GQD/L-Cys coreactant system in (a) air-saturated, (b) nitrogen-saturated and (c) oxygen-saturated PBS (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; scan rate: 0.6 V/s; pH value: 5).

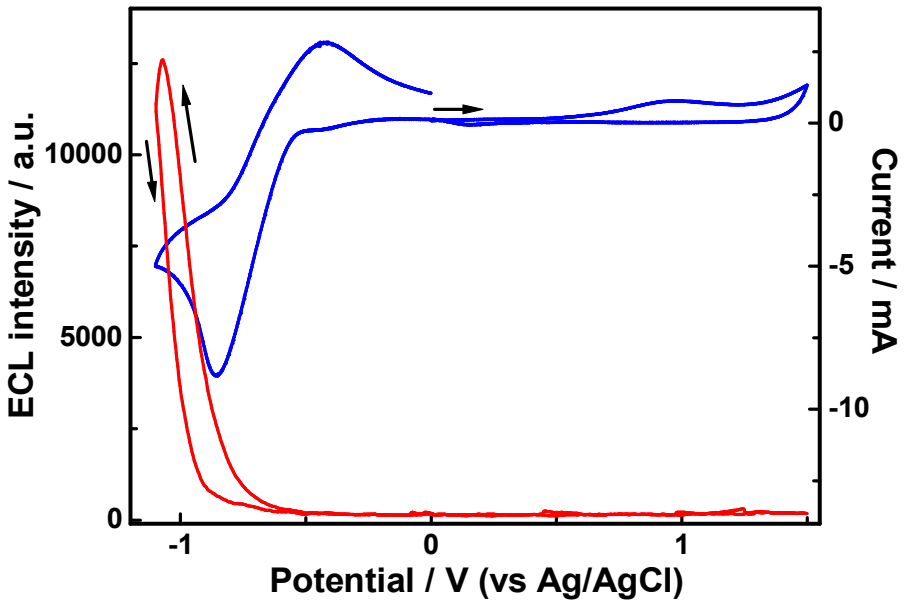

Figure S8. Cyclic voltammogram (blue curve) and ECL potential curve (red curve) of 0.150 mg/mL GQDs + 0.5 mM thioglycollic acid in air-saturated PBS (pH value: 5, scan rate: 0.6 V/s).

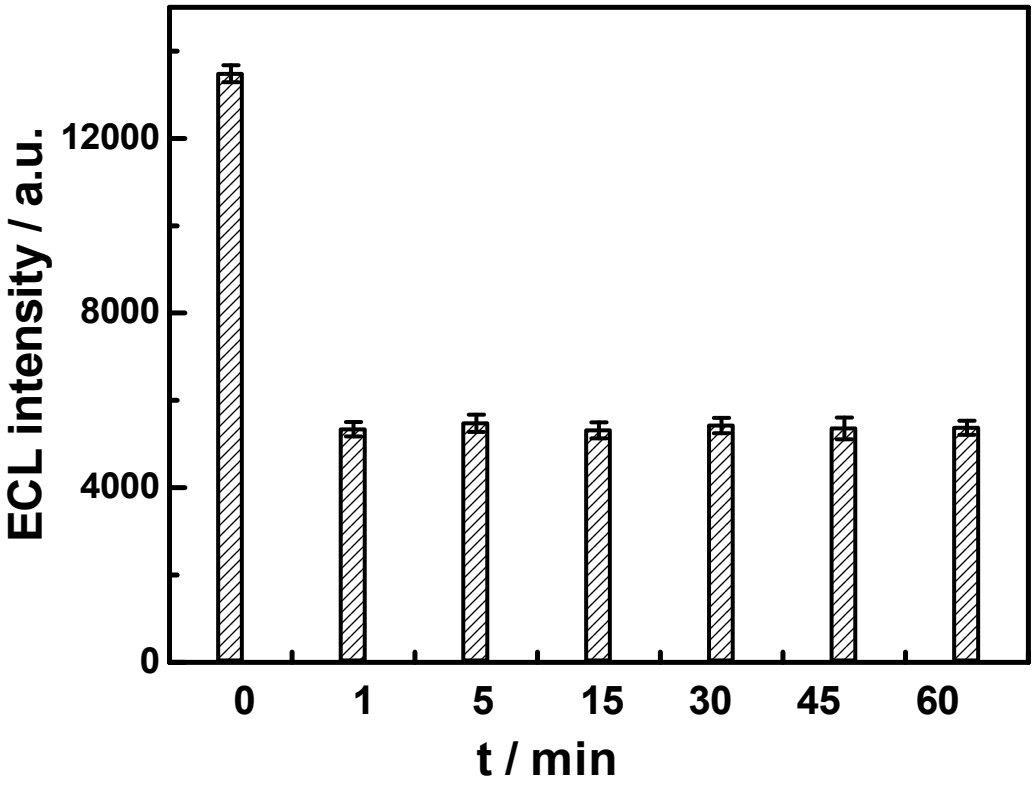

Figure S9. Time-dependent ECL response of the GQD/L-Cys coreactant system to 10 μM Pb^{2+} in pH 5 PBS (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; scan rate: 0.6 V/s; pH value: 5).

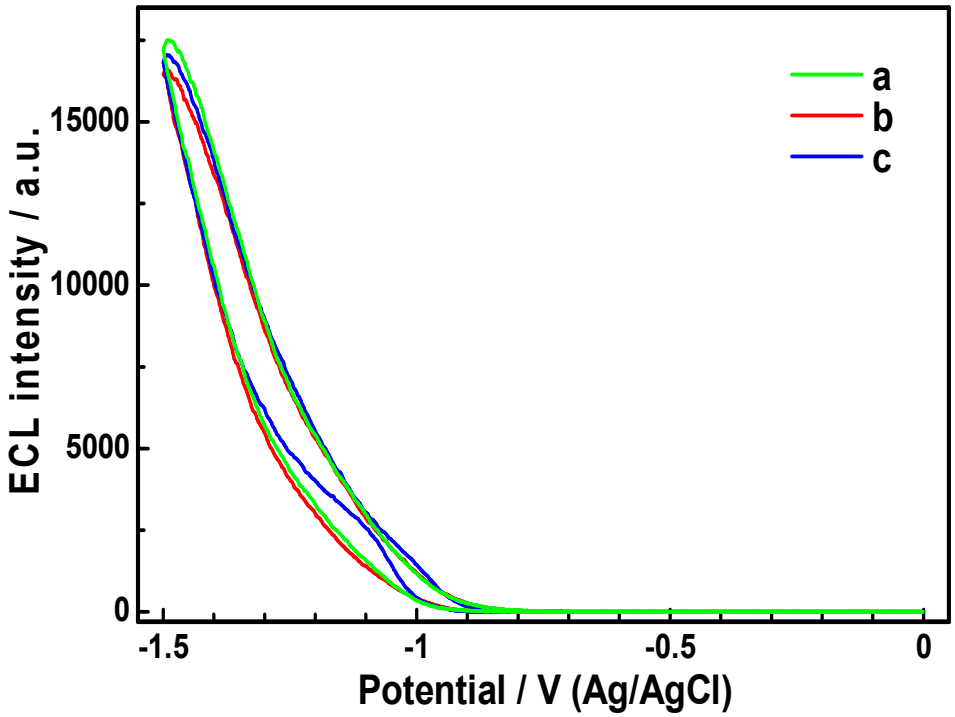

Figure S10. ECL of GQD/$S_2O_8^{2-}$ system (a) and its response to Pb^{2+} (b), Pb^{2+} + L-Cys (c). (concentration of GQDs: 0.150 mg/mL; concentration of L-Cys: 0.5 mM; concentration of $S_2O_8^{2-}$: 1mM; concentration of Pb^{2+}: 10 μM; pH value: 5; potential window: 0 to -1.50 V; scan rate: 0.6 V/s; initial potential: 0 V; scan direction: negative).