Electronic Supplementary Information (ESI)

Visual discrimination of dihydroxybenzene isomer based on nitrogen-doped graphene quantum dots-silver nanoparticles hybrid

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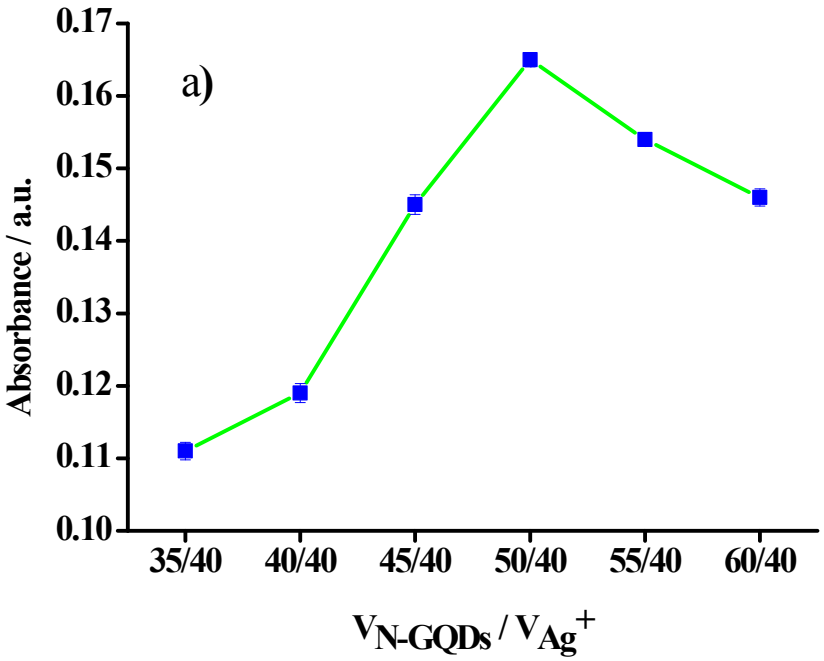
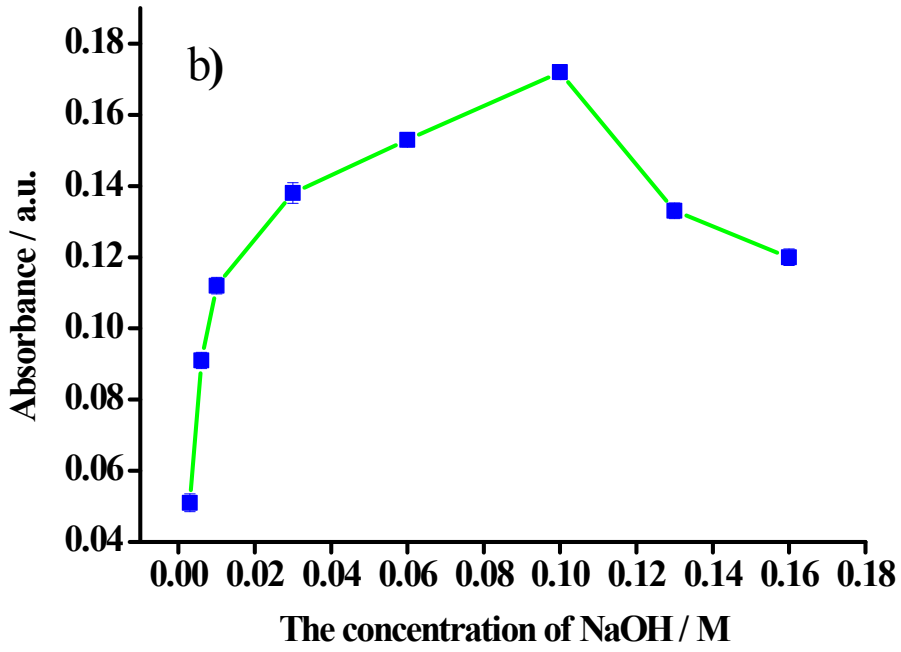




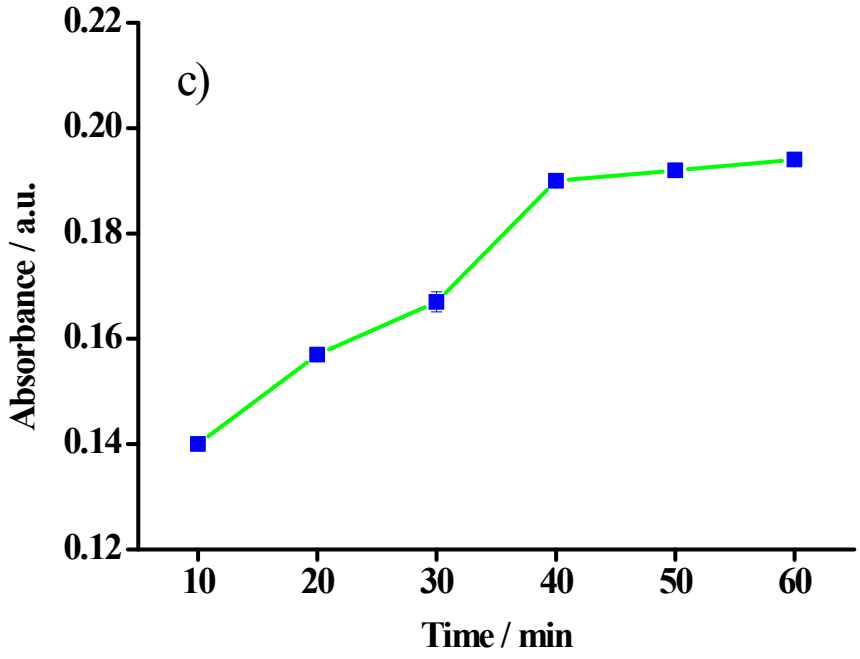


Fig. S1 a) Effect of the doge of N-GQDs on relative absorbance of N-GQDs/AgNPs hybrid; b) Effect of the concentration of NaOH on relative absorbance of N-GQDs/AgNPs hybrid; c) Effect of the reaction time on relative absorbance of N-GQDs/AgNPs hybrid. The concentrations of N-GQDs were 0.406 mg mL^{-1}.

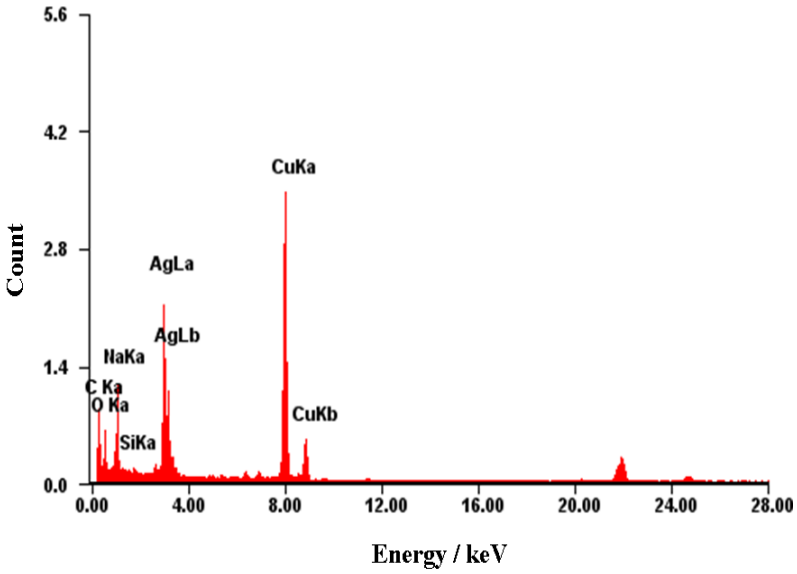
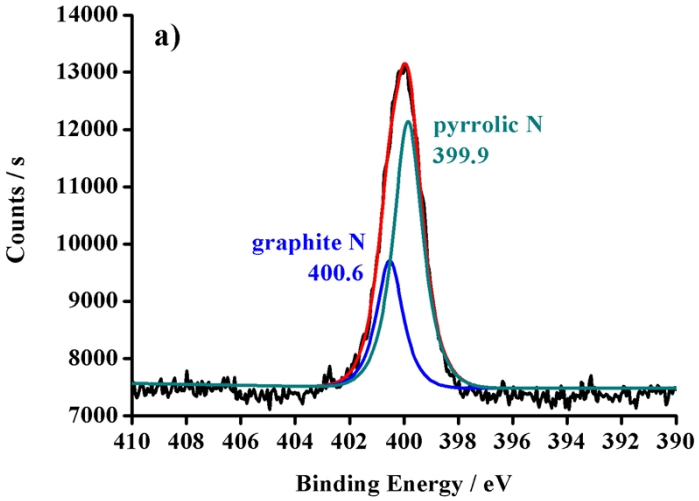
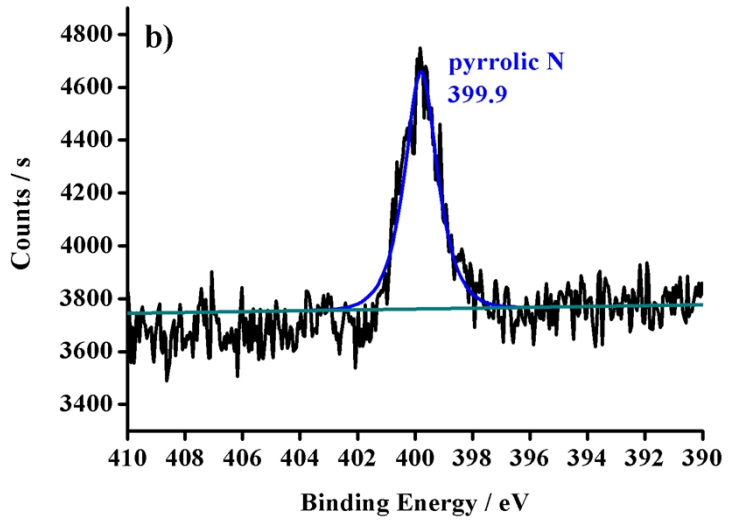


Fig. S2 Energy-dispersive spectrum (EDS) of the N-GQDs/AgNPs.





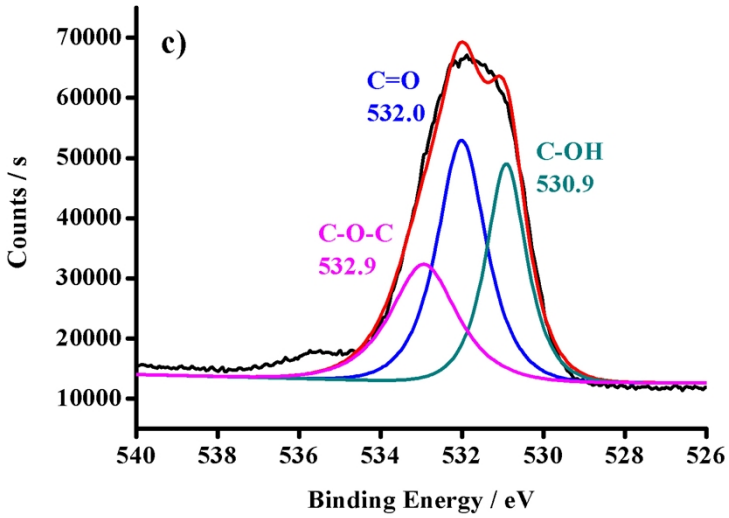
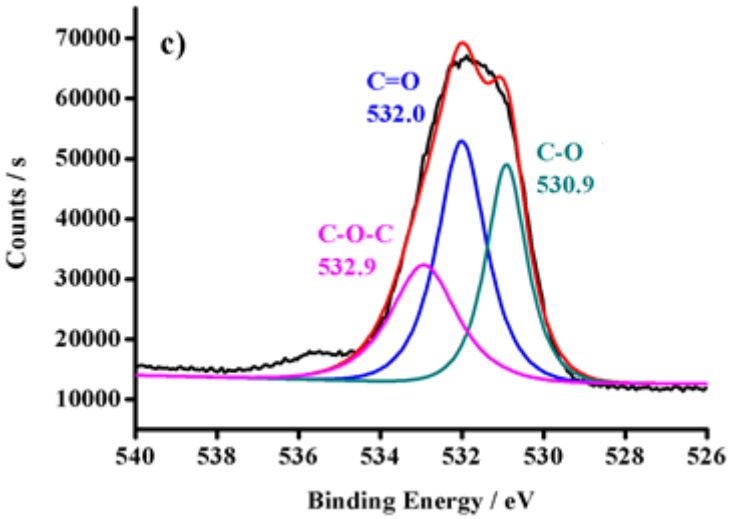


Fig. S3c has been amended as:



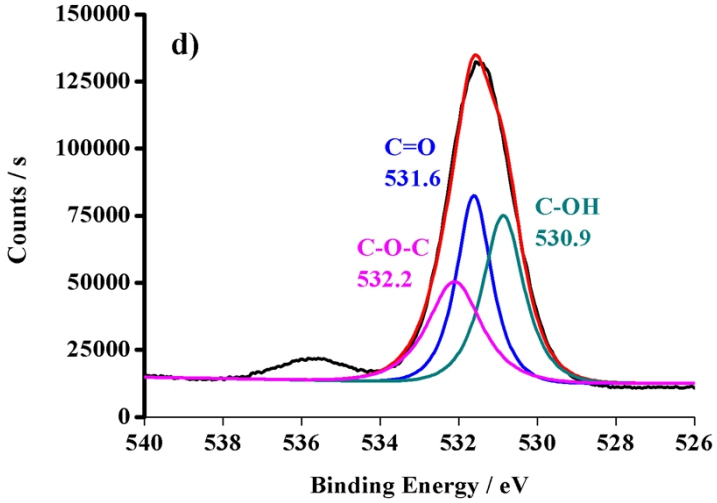


Fig. S3d has been amended as:

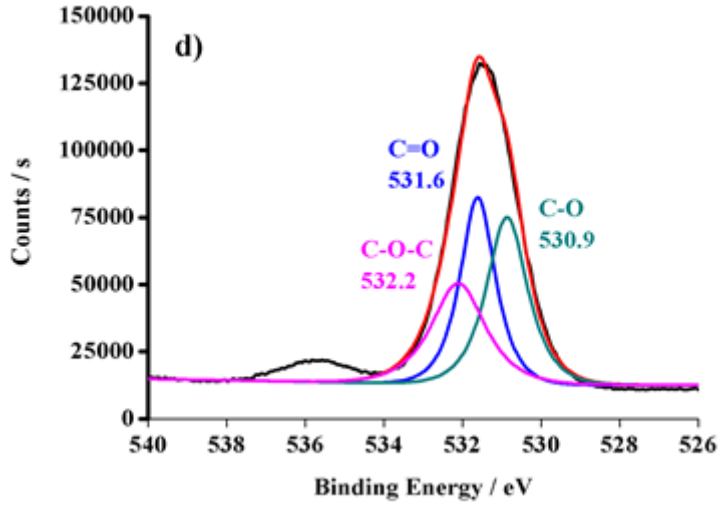


Fig. S3 XPS spectra of N-GQDs (a) and N-GQDs/AgNPs (b); O1s XPS spectra of N-GQDs (c) and N-GQDs/AgNPs (d).

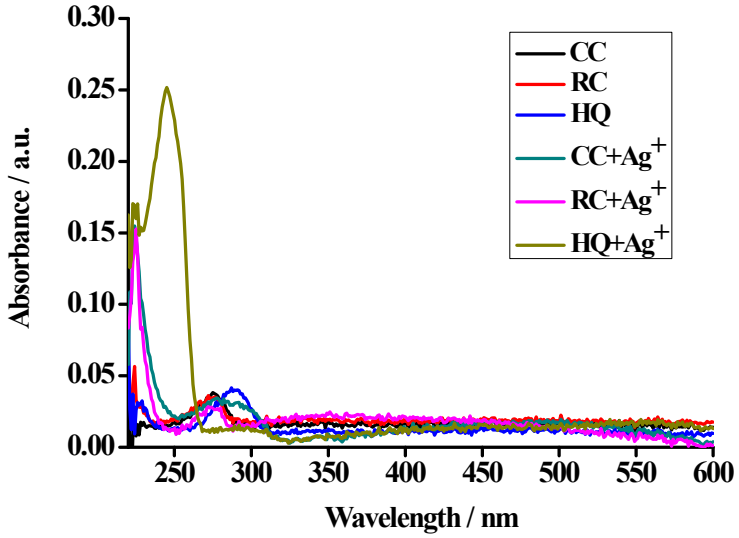


Fig. S4 UV−vis absorption spectra of sample solutions under different conditions. The concentrations of Ag^{+}, CC, RC, and HQ were 45.0 μM, 10.0 μM, 10.0 μM and 10.0 μM, respectively.

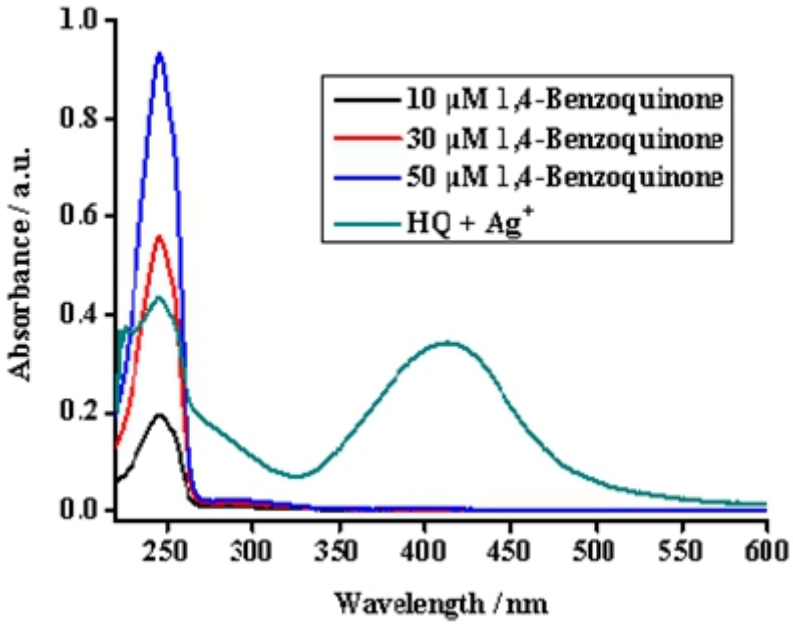


Fig. S5 UV−vis absorption spectra of sample solutions and standard 1,4-benzoquinone solutions. The concentrations of Ag^+, HQ and 1,4-benzoquinone were 45.0 μM, 10.0 μM, 10.0 μM, 30 .0 μM and 50.0 μM, respectively.

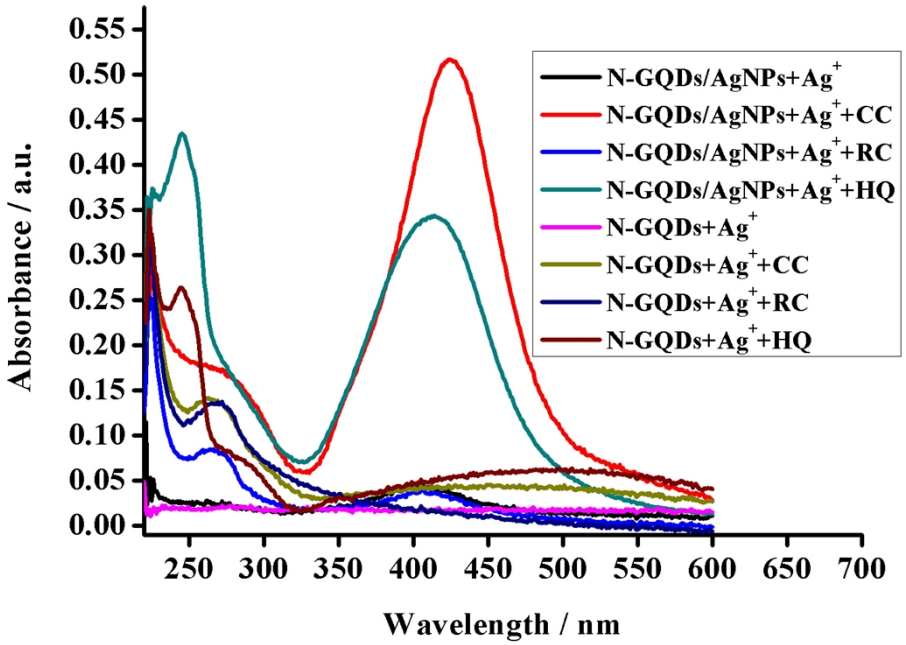


Fig. S6 UV−vis absorption spectra of sample solutions under different conditions. The concentrations of Ag^+, CC, RC, and HQ were 45.0 μM, 10.0 μM, 10.0 μM and 10.0 μM, respectively.

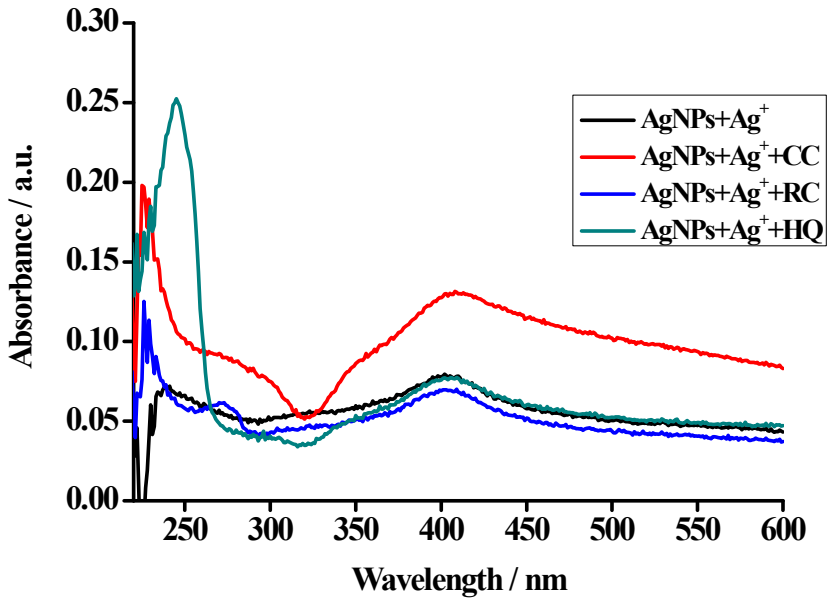
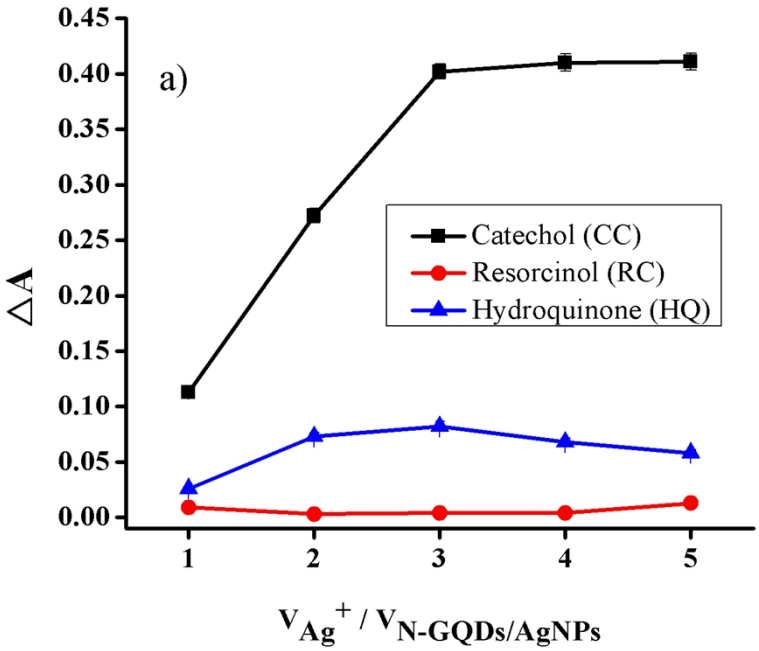


Fig. S7 UV−vis absorption spectra of sample solutions under different conditions. The concentrations of Ag^{+}, CC, RC, and HQ were 45.0 μM, 10.0 μM, 10.0 μM and 10.0 μM,, respectively.



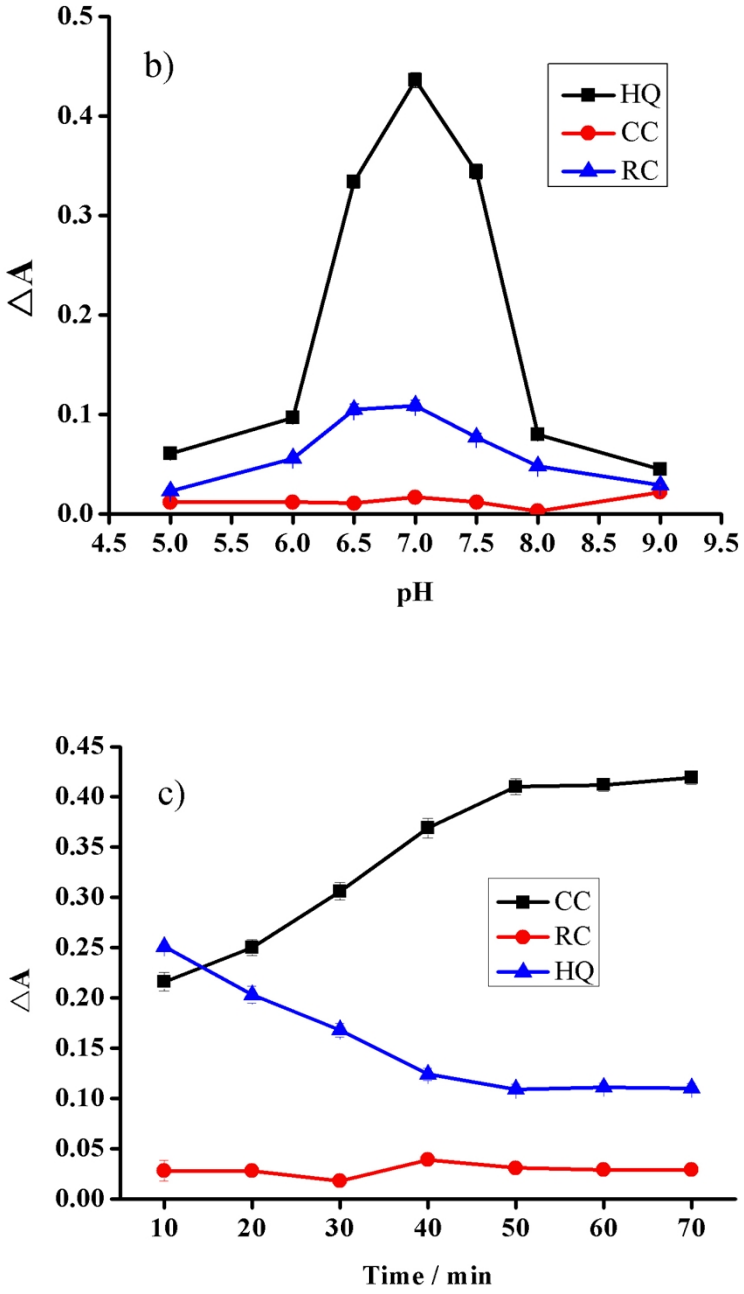


Fig. S8 a) Effect of the doge of Ag^{+} on catalytic ability of N-GQDs/AgNPs hybrid; b) Effect of the concentration of pH on catalytic ability of N-GQDs/AgNPs hybrid; c) Effect of the reaction time on catalytic ability of N-GQDs/AgNPs hybrid. ~~The concentrations of N-GQDs were 0.406 mg mL^{-1}.~~

Table S1 Comparison of analytical methods for the detection of CC and HQ

Type	Detection range (μM)		Limit of detection (nM)		Ref.
	CC	HQ	CC	HQ	
Electrospun carbon nanofibers modified electrode	1–200	1–200	200	400	1
Poly-amidosulfonic acid and multi-wall carbon nanotubes modified glassy carbon electrode	6–180	6–100	100	100	2
Sodium tripolyphosphate capped Mn-doped ZnS quantum dots	0.5−5	–	53	–	3
Fluorescent N-doped carbon dots	2.66−344	–	300	–	4
High-performance liquid chromatogramphy on hypercross-linked polystyrene	1.65–454	1.24–363	908	495	5
Determination of hydroquinone by UV–vis spectrophotometry	–	0.64−18.2	–	191	6
Colorimetric sensing based on N-GQDs/AgNPs hybrid-Ag^+ system	0.1−15	0.3−20	30	100	this study

Notes and references

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