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To New Journal of Chemistry

Supplementary Information for

Silver modified carbon quantum dots for solvent-free

selective oxidation of cyclohexane

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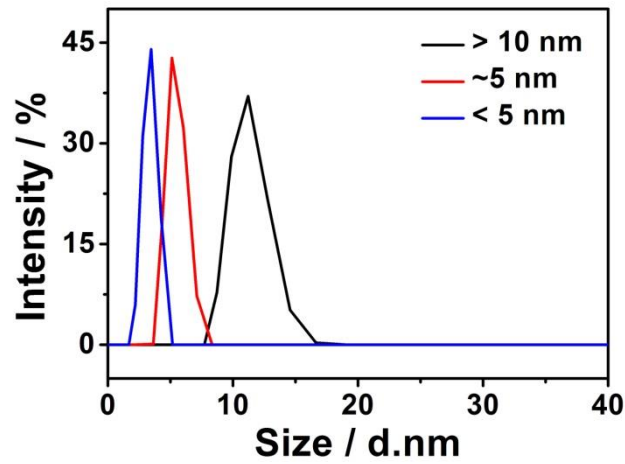


Fig. S1 DLS size distribution histograms of CQDs with different sizes: <5 nm, ~5 nm and >10 nm.

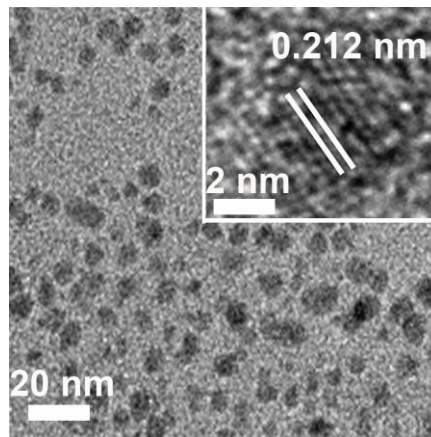


Fig. S2 Typical TEM image of CQDs.

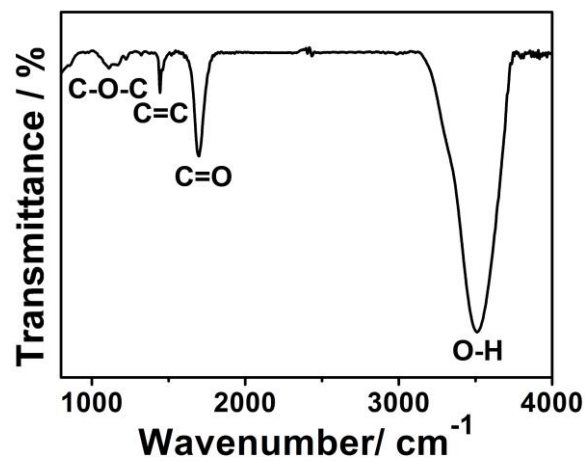


Fig. S3 The FT-IR spectrum of CQDs.

Table S1 Selective oxidation of cyclohexane with Ag/CQDs as catalyst.^a

Reaction time [h]	Conversion [%]	Selectivity [%]		
		-one ^b	KA oil	Epo- ^c
6	16.1	90.2	97.6	2.3
12	30.3	89.8	97.1	2.8
24	43.6	88.6	96.4	3.5
36	51.9	85.9	95.9	4.0
48	58.9	84.6	95.2	4.7

^aReaction conditions: cyclohexane 10 mL; catalyst 20.0 mg; reaction time 48 h; temperature 60 °C; TBHP 10 mL; visible light. ^b-one = cyclohexanone, ^cEpo- = epoxycyclohexane.

Table S2 Selective oxidation of cyclohexane with Ag/CQDs as catalyst over cycling ten times.^a

Cycle times	Conversion [%]	Selectivity [%]		
		-one ^b	KA oil	Epo- ^c
1	58.9	84.6	95.2	4.7
2	58.8	84.1	94.7	5.2
3	58.3	83.9	94.9	5.0
4	58.7	83.6	95.1	4.8
5	58.0	84.2	93.8	6.1
6	58.5	84.0	94.6	5.3
7	58.4	83.6	95.2	4.7

8	58.9	83.8	94.9	5.0
9	58.2	84.5	94.7	5.2
10	58.5	84.1	95.0	4.9

^aReaction conditions: solvent-free cyclohexane 10 mL; catalyst 20.0 mg; reaction time 48 h; temperature 60 °C; TBHP 10 mL; visible light. ^b-one = cyclohexanone, ^cEpo- = epoxycyclohexane.

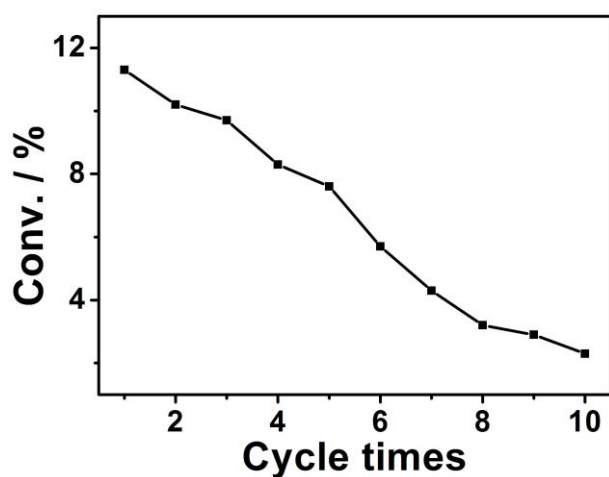


Fig. S4 The conversion of cyclohexane with Ag NPs as catalyst over cycling for 10 times.

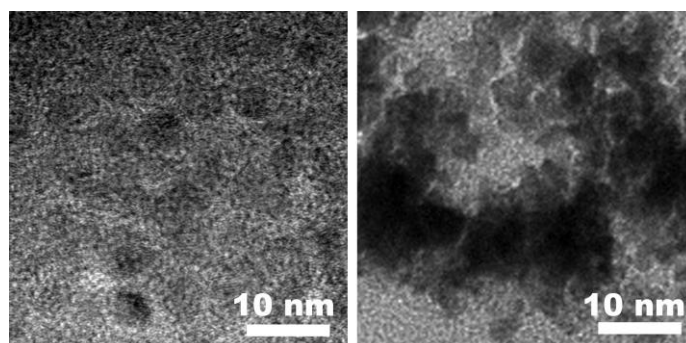


Fig. S5 Typical TEM images of Ag NPs (a) before and (b) after ten repeated

consecutive runs, respectively.

Table S3 Selective oxidation of cyclohexane to cyclohexanone with Ag/CQDs as catalyst under different light conditions or not.^a

Light condition	Conversion [%]	Selectivity to cyclohexanone [%]
Visible light	58.9	84.6
UV light	13.1	80.6
IR light	10.1	79.3
In dark	4.6	76.5

^aReaction conditions: solvent-free cyclohexane 10 mL; catalyst 20.0 mg; reaction time 48 h; temperature 60 °C; TBHP 10 mL.

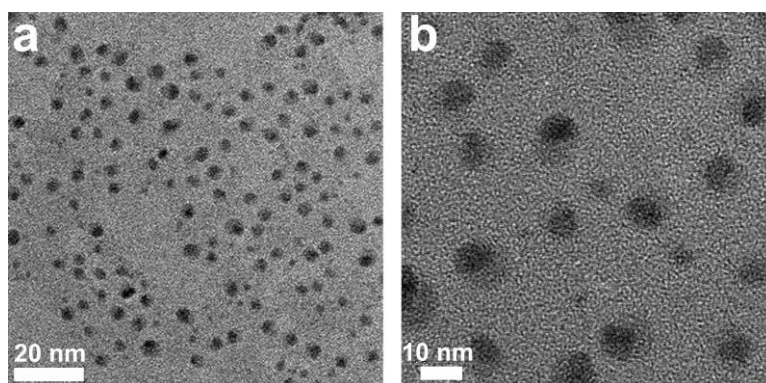


Fig. S6 Typical TEM images of Ag/CQDs with different sizes: (a) < 5 nm, (b) > 10 nm.

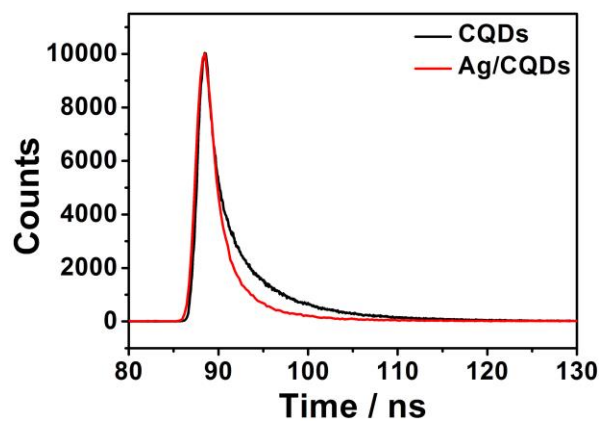


Fig. S7 The luminescence decays of CQDs and Ag/CQDs (410 nm excitation, monitored with a 550 nm narrow bandpassfilter).