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Supplementary Information

Visible light driven photocatalytic degradation of organic pollutants via carbon quantum dots/TiO_2

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In order to study the carbon powder in the synthesis process of CQDs, the pyrolysis product of the tube furnace was analyzed by SEM, and the carbon powder after washing without dilute hydrochloric acid and washing with dilute hydrochloric acid was compared. It can be seen from Fig 1 (a-b) that there are impurities remaining on the surface of the carbon powder. These impurities may be the residues of the compounds in the olive leaves after pyrolysis, which may be affect the synthesis process of CQDs. The introduction of impurities reduce the purity of CQDs will be even affected its fluorescence performance. It can be seen from Fig 1 (c-d) that after washing, the impurities in the toner have been removed, and there is no change in the morphology of the toner. Compared with unwashed toner, the purity of the toner is higher. Therefore, it is necessary to wash the toner. Using the washed carbon powder in the preparation of CQDs is expected to obtain products with high purity and excellent performance.

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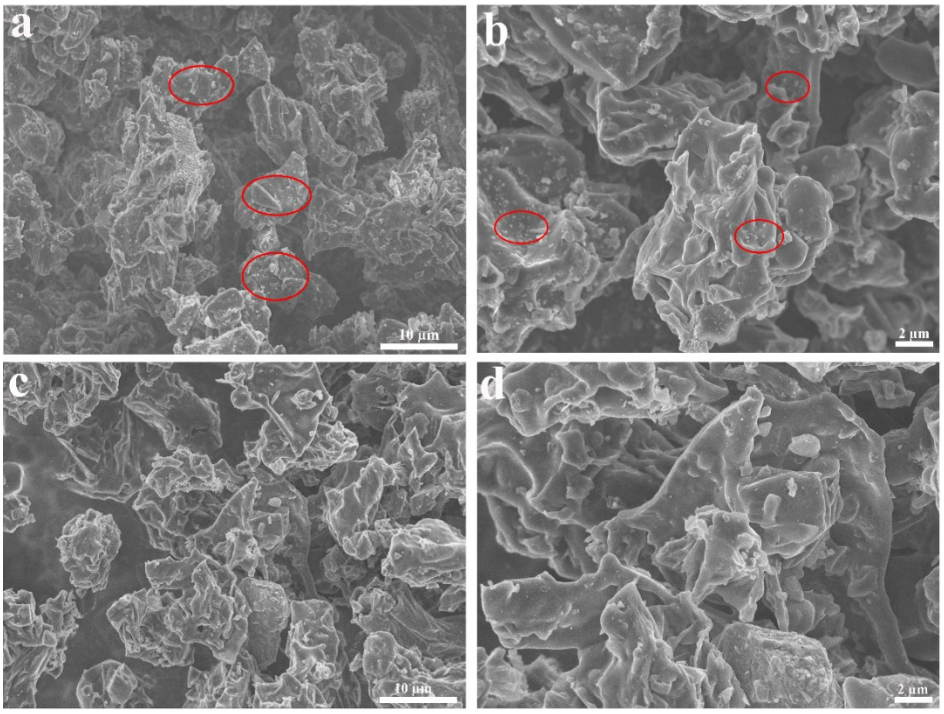

Fig. S1. SEM images of carbon powder: unwashed (a-b), after washing (c-d)

Particle size（nm）	1.1053	1.2217	1.3503	1.4925	1.6496	1.8233	2.0153
Frequency (%)	0.27	0.22	0.17	0.12	0.08	0.05	0.02
Particle size（nm）	2.2275	2.4621	2.7213	3.0079	3.3246	3.6747	4.0616
Frequency（%）	0.01	0.007	0.003	0.001	0.0006	0.0002	0.0001

Table S1 Data table of particle size distribution

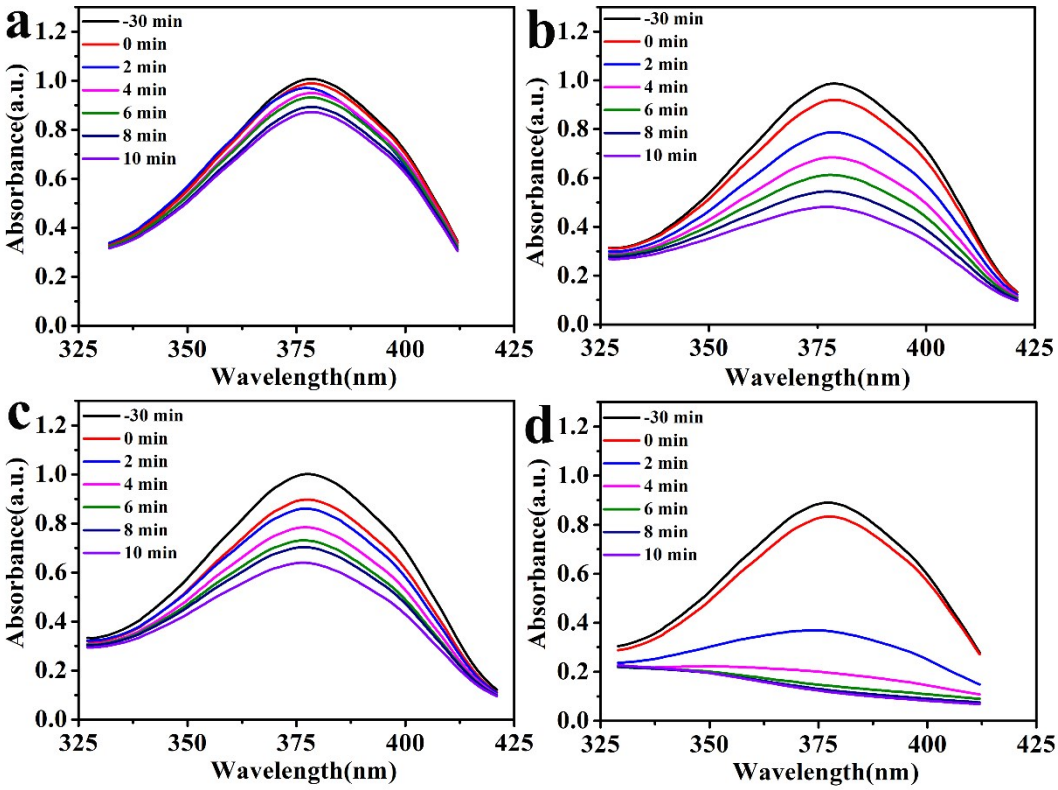

Fig. S2. UV-vis spectra of TC degradation by different catalysts: no photocatalyst (a), CQDs (b), TiO_2 (c), 5% CQDs/TiO_2（d）

Fig S3 shows the UV-visible absorption spectrum of CQDs. It can be seen that there are two obvious absorption peaks at 239 nm and 341 nm. The $\pi \rightarrow \pi^*$ transition of C=C at 239 nm, and $n \rightarrow \pi^*$ transition of the carboxyl group on the surface of CQDs at 341 nm[1, 2]. It can also be seen from the Fig S3 that the absorption peak of CQDs at 341 nm continues to the visible light region, indicating that CQDs also absorb visible light.

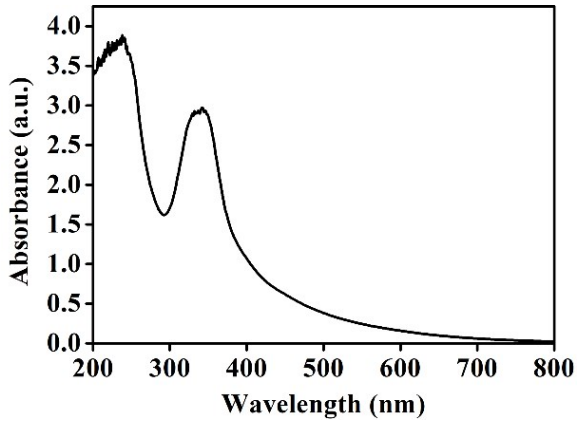

Fig. S3. UV-vis spectrum of CQDs

References

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