

Supporting Information

Ultrasensitive detection of acephate based on carbon quantum dots-mediated fluorescence inner filter effects

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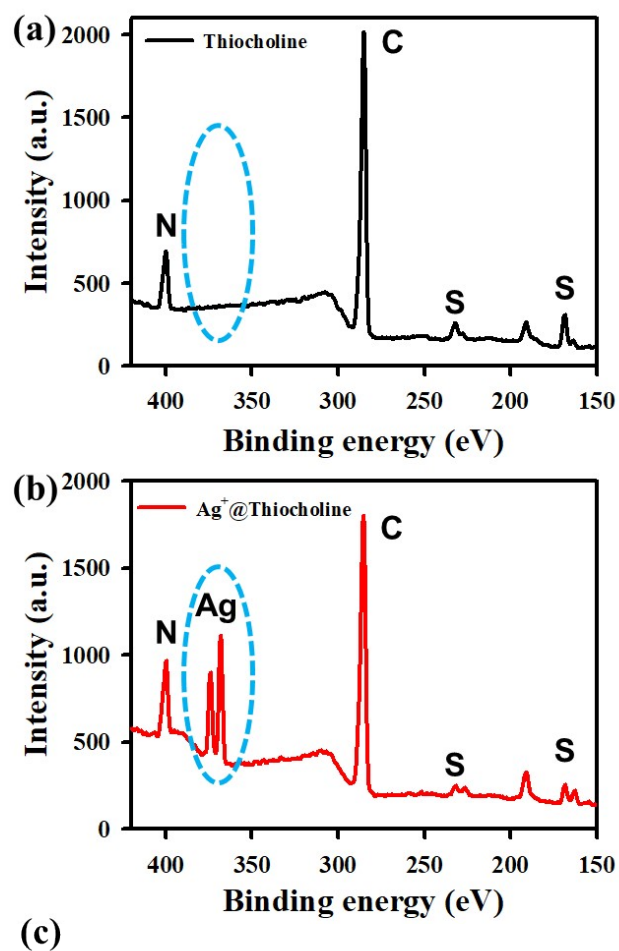
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XPS characterization of Ag⁺-Thiocholine polymers and high-resolution TEM of CQDs characterization.

1. XPS analysis

Ag^+ plays a crucial role in the formation of DAP and thus the induction of IFE. Thiocholine is formed under the catalysis of acetylcholinesterase, and the hydrolysate thiocholine can bind with Ag^+ to form a complex to inhibit IFE. Organophosphorus residue can inhibit the acetylcholinesterase activity, leading to stronger IFE effects. To further explore the mechanism, XPS was applied to characterize the formation of the complex between Ag^+ and thiocholine. Figure S1 shows the XPS characterization of thiocholine in the presence and absence of Ag^+ . Figure S1 (b) XPS measurement shows the chemical state of Ag^+ -Thiocholine polymers. Compared with Figure S1 (a), Ag 3d binding peaks were measured at 368.2 eV ($3d_{5/2}$) and 374.2 eV ($3d_{3/2}$) [1]. Figure S1 (c) shows the quantitative data of XPS. After incubation with Ag^+ , the content of Ag increased, but the content of C and S decreased, indicating that thiocholine containing thiol group (-SH) and Ag^+ formed a linear metal polymer [2,3].



Element (atomic, %)	Ag	N	C	S
Thiocholine	0	9.61	86.37	4.02
Ag ⁺ @Thiocholine	2.15	10.67	83.98	3.20

Figure S1. XPS characterization of Thiocholine (a) and Ag⁺@ Thiocholine(b). (c)XPS quantitative data of Thiocholine before and after incubation with Ag⁺.

2. CQDs TEM analysis

It can be seen from the Figure S2 that the size of CQDs is about 3~5 nm.

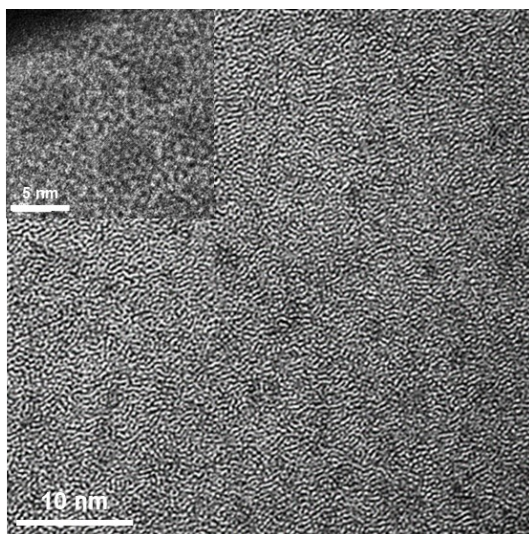


Figure S2. TEM image of the CQDs.

References

- [1] N. Feng, Q. Wang, A. Zheng, Z. Zhang, J. Fan, S. Liu, J.-P. Amoureux, F. Deng, Understanding the High Photocatalytic Activity of (B, Ag)-Codoped TiO₂ under Solar-Light Irradiation with XPS, Solid-State NMR, and DFT Calculations, *J. Am. Chem. Soc.*, 2013, 135, 1607-1616.
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- [3] D. Tao, Q. Wang, X. Yan, N. Chen, Z. Li, Y. Jiang, Ag⁺ coordination polymers of a chiral thiol ligand bearing an AIE fluorophore, *Chem. Commun.*, 2017, 53, 255-258.