Electronic Supplementary Material (ESI) for Analyst.

The colorimetry and smartphone determination of perfluorooctane sulfonate based on a cytidine 5'-monophosphate-capped gold nanoclusters with peroxidase-like activity

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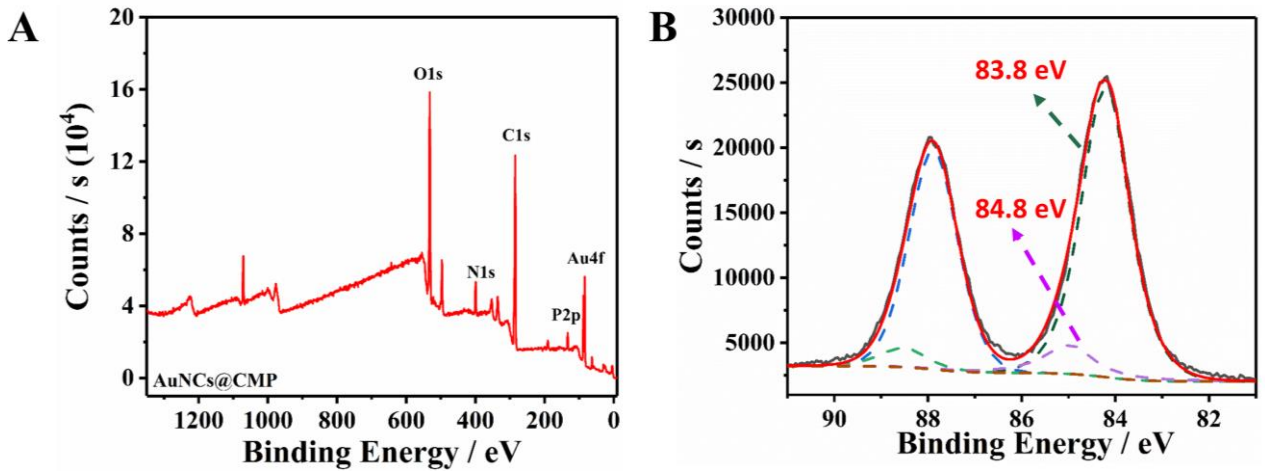

Fig. S1 XPS spectra of (A) AuNCs@CMP and (B) Au4f in the AuNCs@CMP, respectively.

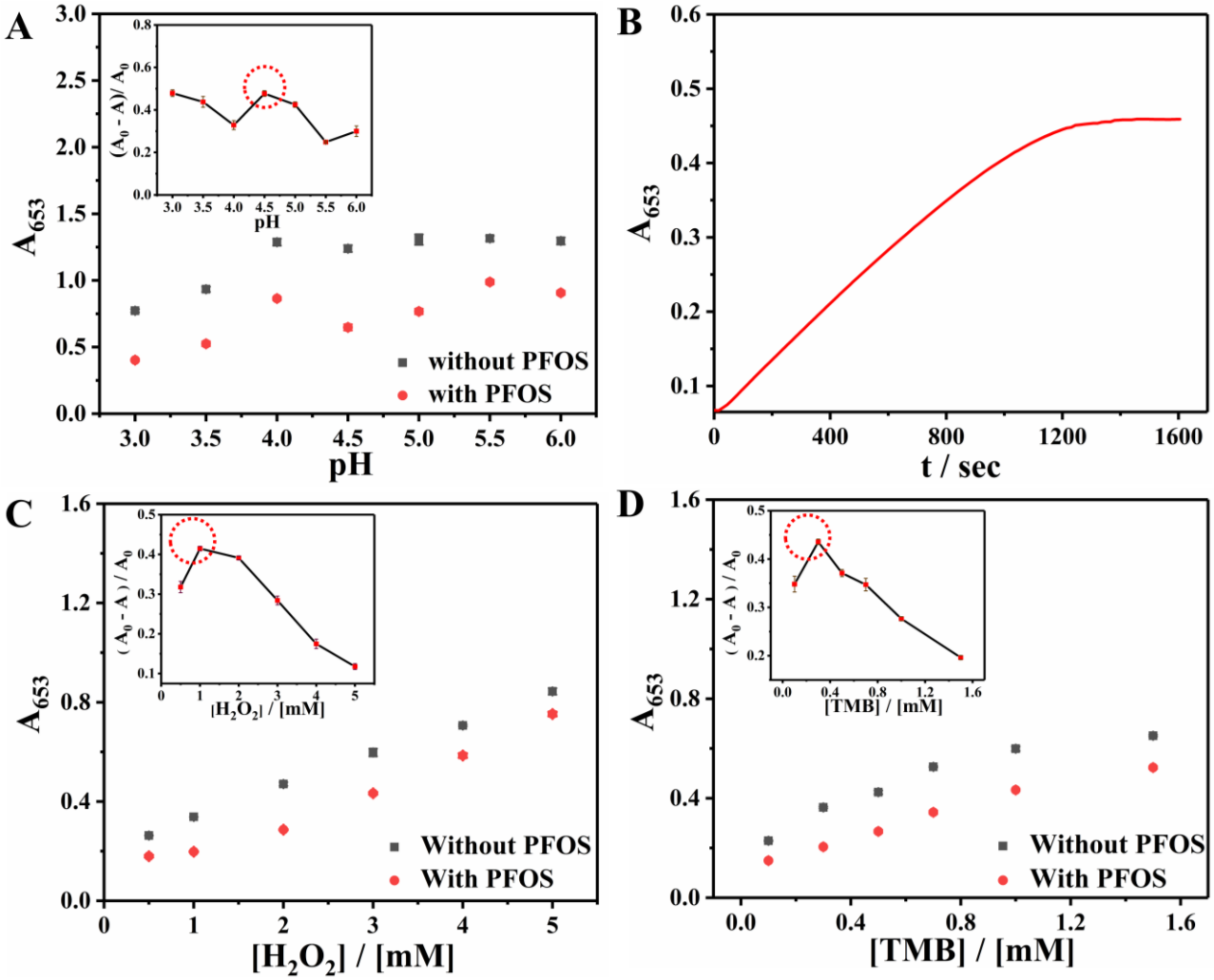

Fig. S2 The catalytic activity changes of the AuNCs/H_2O_2/TMB system at different (A) pH; (B) reaction time, the concentrations of (C) H_2O_2; (D) TMB, in the absence and presence of PFOS (50 μM). The insets are magnitude of the absorbance reduction, $(A_0\text{-}A)/A_0$, induced by PFOS at different conditions.

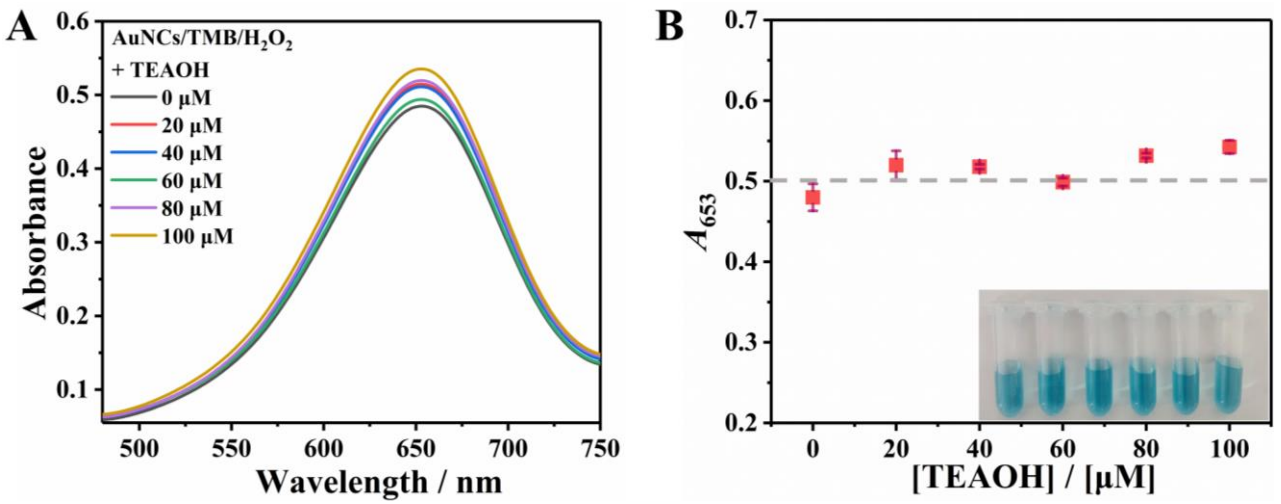

Fig. S3 (A) UV-Vis absorption spectra of the AuNCs/H_2O_2/TMB system in the presence of different concentrations of TEAOH (0-100 μM). (B) Plot of the corresponding values of A_{653} in the presence of different amounts of TEAOH (0-100 μM).

Table S1 Parameters for the PFOS determination in the tap water or soil extracts, respectively

Samples & Nos		Spiked (μM)	Examined (μM) (n=5)	Recovery (%)	RSD (%)
tap water	#1	20.00	19.88±0.299	99.40	1.506
	#2	30.00	30.12±0.360	100.4	1.195
	#3	40.00	40.08±0.688	100.2	1.717
soil extract	#4	20.00	19.72±0.204	98.60	1.034
	#5	30.00	29.76±1.029	99.20	3.456
	#6	40.00	39.44±1.228	98.20	3.116

Table S2 Comparison of the analytical performance of different methodologies towards PFOS detection.

Materials	Methodology	LOD	Linear range	Distinguishing PFOS/PFOA	Ref.
MIP@TiO_2 nanotube	Photoelectrochemical assay	160 nM	0.5 - 10 μM	no	[S1]
GC5A-6C•Fl	Fluorescence	21.4 nM	0 - 0.6μM	no	[S2]
Erythrosine B-siloxane	Fluorescence	4.65 μM	0 - 30 μM	yes	[S3]
		2.7 μM	30 - 65μM		
Janus Green B	Resonance light scattering	5.6 nM	0.05 - 9.0μM	yes	[S4]
toluidine blue	Rayleigh scattering and Colorimetry	112 nM	1 - 20 μM	yes	[S5]
MoS_2/Fe_3O_4	Colorimetry	8.6 nM	0.1 - 12.5 μM	no	[S6]
CoNCN	Colorimetry	20 nM	0.01 - 100 μM	no	[S7]
Au@PEG-F NPs	Colorimetry	20 nM	0.02 - 2 μM	no	[S8]
PAD (methylene green)	Colorimetry	15.9 μM	—	no	[S9]
AuNCs/H_2O_2/TMB	Colorimetry	150 nM	2 - 50 μM	yes	This Work

References

S1. T. T. Tran, J. Li, H. Feng, J. Cai, L. Yuan, N. Wang and Q. Cai, Sens. Actuators B Chem., 2014, 190, 745-751.

S2. Z. Zheng, H. Yu, W.-C. Geng, X.-Y. Hu, Y.-Y. Wang, Z. Li, Y. Wang and D.-S. Guo, Nat. Commun., 2019, 10, 5762.

S3. W. Lin, Z. Gou, A. Wang, X. Zhang and Y. Zuo, Sens. Actuators B Chem., 2022, 367, 132017.

S4. Z. Cheng, F. Zhang, X. Chen, L. Du, C. Gao and K. Tan, Anal. Methods, 2016, 8, 8042-8048.

S5. J. He, P. Qiu, J. Song, S. Zhang and Y. Bai, Anal. Bioanal. Chem., 2020, 412, 5329-5339.

S6. J. Liu, J. Du, Y. Su and H. Zhao, Microchem. J., 2019, 149, 104019.

S7. Y. Li, Y. Lu, X. Zhang, H. Cao and Y. Huang, Microchem. J., 2022, 181, 107814.

S8. H. Niu, S. Wang, Z. Zhou, Y. Ma, X. Ma and Y. Cai, Anal. Chem., 2014, 86, 4170-4177.

S9. R. F. Menger, J. J. Beck, T. Borch and C. S. Henry, Acs Es&T Water, 2022, 2, 565-572.