

Supplementary Information

An on-off-on chemiluminescence resonance energy transfer sensing platform based on Au/Pt@Cu₂O/CuO nanozyme for the determination of ascorbic acid

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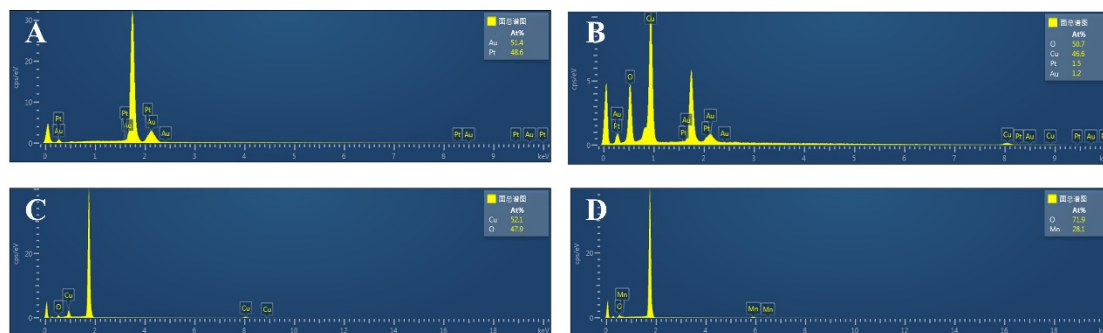


Fig. S1 EDX energy spectra of **(A)** Au@Pt NPs; **(B)** Au/Pt@Cu₂O/CuO NPs; **(C)** Cu₂O@CuO NPs and **(D)** MnO₂ NSs

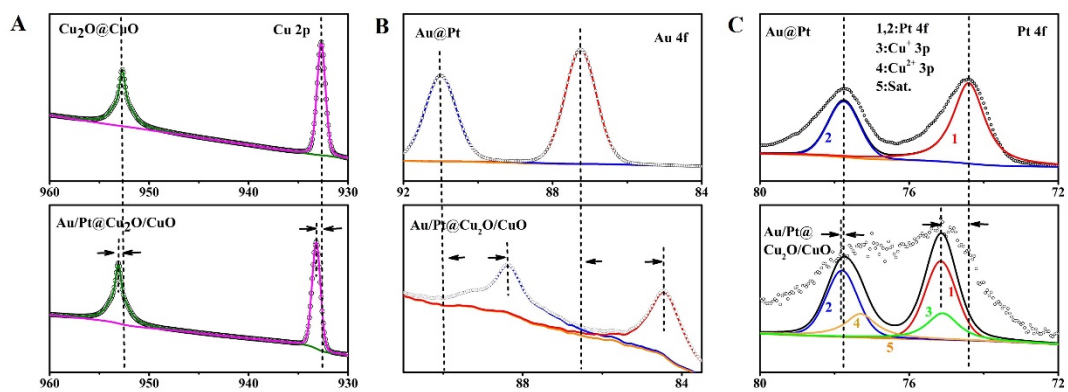


Fig. S2 XPS spectra of **(A)** Cu 2p, **(B)** Au 4f and **(C)** Pt 4f in Au/Pt, $\text{Cu}_2\text{O}/\text{CuO}$, and Au/Pt@ $\text{Cu}_2\text{O}/\text{CuO}$

Table S1 The influence of different radical scavengers on the Luminol-H₂O₂-
Au/Pt@Cu₂O/CuO NPs system

Quenchers	Intermediate	Concentration	Percent inhibition, %
Ascorbic acid	·OH, O ₂ ⁻	2 mM	98.65
TEMPO	·OH, ¹ O ₂	2 mM	99.59
Methanol	·OH	2 mM	95.88
Histidine	¹ O ₂	2 mM	27.84
SOD	O ₂ ⁻	0.2 μg/mg	98.07

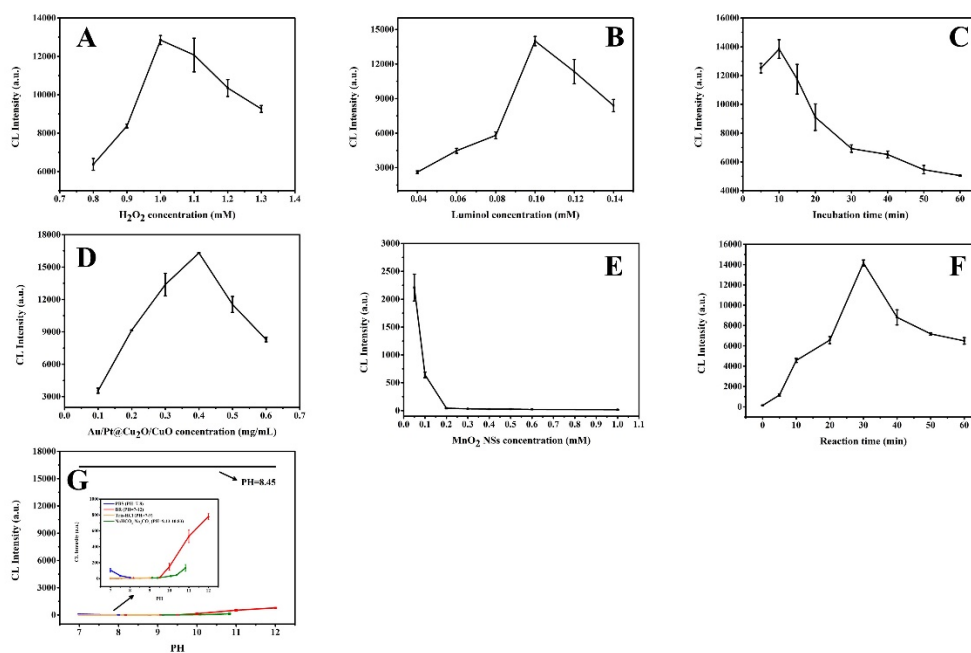


Fig. S3 Optimization of H_2O_2 concentration (**A**), Luminol concentration (**B**), incubation time of H_2O_2 and Au/Pt@ $\text{Cu}_2\text{O}/\text{CuO}$ NPs (**C**), Au/Pt@ $\text{Cu}_2\text{O}/\text{CuO}$ NPs concentration (**D**), MnO_2 NSs concentration (**E**), reaction time of MnO_2 NSs and ascorbic acid (**F**), and effect of buffer solutions on the CL system (PBS, BR, Tris-HCl, and $\text{Na}_2\text{CO}_3\text{-NaHCO}_3$) (**G**)

References

- [1] X. Zhang, H. Zhi, M. Zhu, F. Wang, H. Meng, L. Feng, Electrochemical/visual dual-readout aptasensor for Ochratoxin A detection integrated into a miniaturized paper-based analytical device, *Biosens Bioelectron*, 180 (2021) 113146. <https://doi.org/10.1016/j.bios.2021.113146>.
- [2] A. Qileng, S. Chen, H. Liang, M. Chen, H. Lei, W. Liu, Y. Liu, Boosting ultralong chemiluminescence for the self-powered time-resolved immunosensor, *Biosens Bioelectron*, 234 (2023) 115338. <https://doi.org/10.1016/j.bios.2023.115338>.
- [3] Z.Z. Dong, L. Lu, C.N. Ko, C. Yang, S. Li, M.Y. Lee, C.H. Leung, D.L. Ma, A $\text{MnO}(2)$ nanosheet-assisted GSH detection platform using an iridium(III) complex as a switch-on luminescent probe, *Nanoscale*, 9 (2017) 4677-4682. <https://doi.org/10.1039/c6nr08357a>.