

SUPPORTING INFORMATION

The heterojunction MnO₂ nanosheet decorated Ag nanowires with enhanced oxidase-like activity for sensitively dual-mode detection of glutathione

Lin Tian^{a,c*}, Zijun Huang^{a*}, Weidan Na^a, Yuanyuan Liu^a, Shuai Wang^b, Yu He^b,
Wenjing Cheng^c, Tianzi Huang^b, Zhao Li^{a*} and Tongxiang Li^{b*}

^a *School of Materials and Chemical Engineering, Xuzhou University of Technology,
Xuzhou 221018, PR China*

^b *School of Food (Biology) Engineering, Xuzhou University of Technology, Xuzhou
221018, PR China*

^c *School of Chemistry and Environmental Science, Yili Normal University, Yining
835000, China.*

Corresponding author: Tel: 86-516-83105518

Email: xzittl@xzit.edu.cn (L. Tian); xzitzl@xzit.edu.cn (Z. Li); litx@xzit.edu.cn (T. Li)

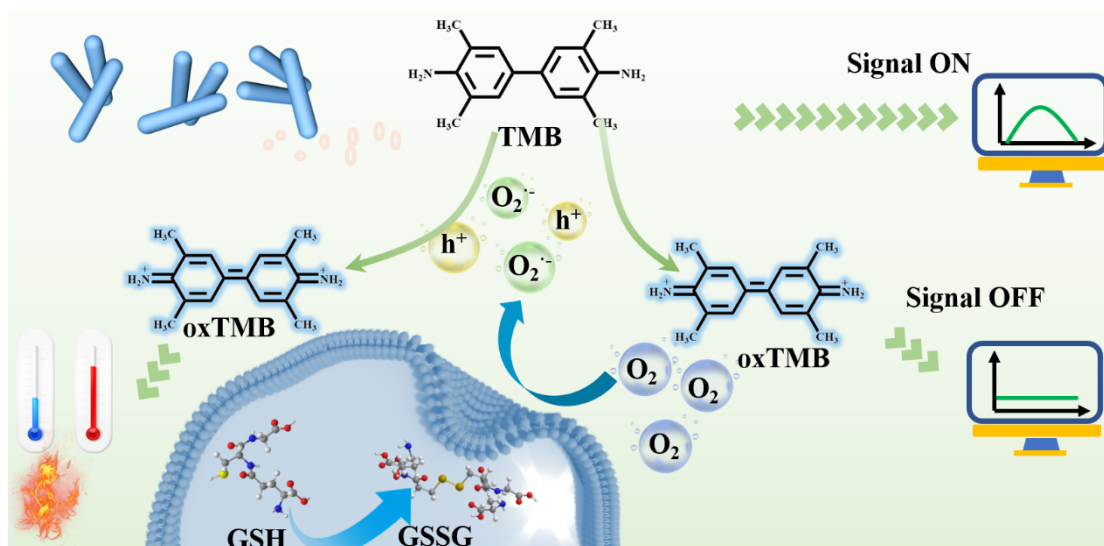


Fig. S1 Scheme of GSH detection based on Ag@MnO₂ with oxidase-like property.

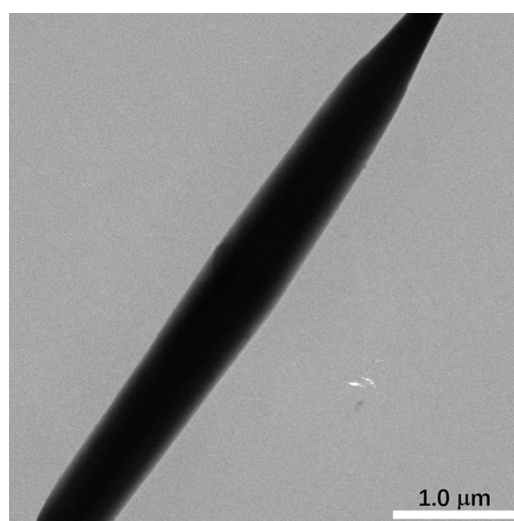


Fig. S2 TEM image of Ag nanowires.

Table S1 Comparison of Ag@MnO₂ and other colorimetric methods for GSH detection

Materials	Linear range (μM)	Detection limit (μM)	Reference
Ag@MnO ₂	0.1-55	0.08	This work
	0.5-60	0.36	
PCN-224-Mn	0.5-60	0.233	[1]
Fe ₅ Mn-DHTP	1-40	0.51	[2]

Mn ₃ O ₄ microspheres	5-60	0.889	[3]
SPB-MnO ₂	0.5-12.5	0.45	[4]
MnO ₂ -nanowire	0.3-15	0.11	[5]
MnO ₂ nanosheets	1-25	0.3	[6]

Table S2 Detection of GSH in actual sample (n = 3)

Sample	Added (μM)	Found (μM)	Recovery (%)	RSD (%)
	0	24.3		0.08
Tumor cells	5	29.6	105.49	2.58
lysates	10	33.8	94.89	4.92
	15	39.6	101.41	4.73
	0	13.6		4.93
Food grade	5	18.3	94.38	3.85
glutathione	10	23.8	101.74	4.59
	15	28.4	99.27	4.41

References

- [1] X. Lai, Y. Shen, S. B. Gao, Y.J. Chen, Y. S. Cui, D. X. Ning, X. B. Ji, Z. W. Liu and L. G. Wang, *Biosens. Bioelectron.*, 2022, **13**, 114446.
- [2] C. Zhang, X. Zhang, Y. Ye, P. Ni, C. Chen, W. Liu, B. Wang, Y. Jiang and Y. Lu, *Analyst*, 2022, **147**(2), 238-246.
- [3] J. Xi, C. Zhu, Y. Wang, Q. Zhang and L. Fan, *RSC Adv.*, 2019, **9**(29), 16509-16514.
- [4] Q. Yang, L. Li, F. Zhao, Y. Wang, Z. Ye and X. Guo, *Mater. Lett.*, 2019, **248**, 89-92.
- [5] X. Zhang, X. Mao, S. Li, W. Dong and Y. Huang, *Sensor. Actuators B-chem.*, 2018, **258**, 80-87.
- [6] J. Liu, L. Meng, Z. Fei, P. J. Dyson, X. Jing and X. Liu, *Biosens. Bioelectron.*, 2017, **90**, 69-74.