Supporting Information

Cobalt-Intercalated α-MoO_3 Nanoribbons Enhance Peroxidase Mimetic Activity and Photothermal Effects for Sterilization

*Jiamin Zhang, Hu Liu, Yuhui Zuo, Shiyang Lv, Yan Liu, Wenfei Lan, Tong Li, Xinyi Li and Xinsheng Wang**

College of Life Sciences, Institute of Biomedical Engineering, Qingdao University, Qingdao 266071 Shandong, China; orcid.org/0000-0001-5338- 8166; Email: wangxsh@qdu.edu.cn

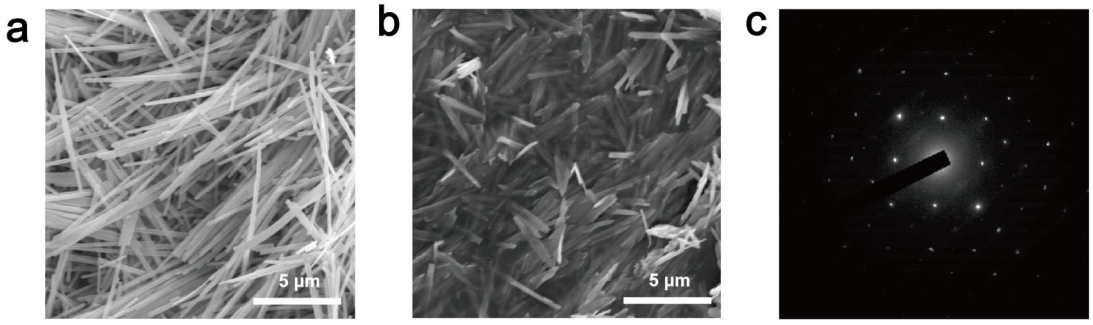

Figure S1. (a) The SEM image of α-MoO_3 nanobelts. (b) The SEM image of Co/MoO_{3-x} nanobelts. (c) The SAED image of Co/MoO_{3-x} nanobelts.

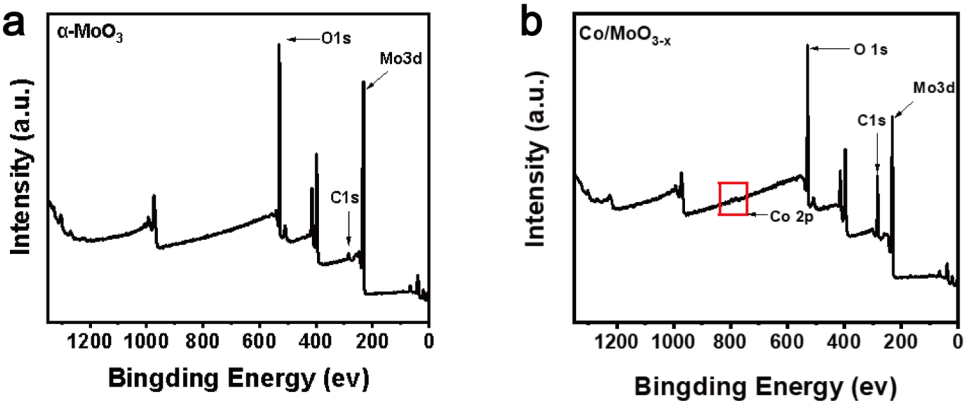

Figure S2. (a) MoO_3 nanobelts full-spectrum scanning of XPS spectra. (b) Co/MoO_{3-x} nanobelts full-spectrum scanning of XPS spectra.

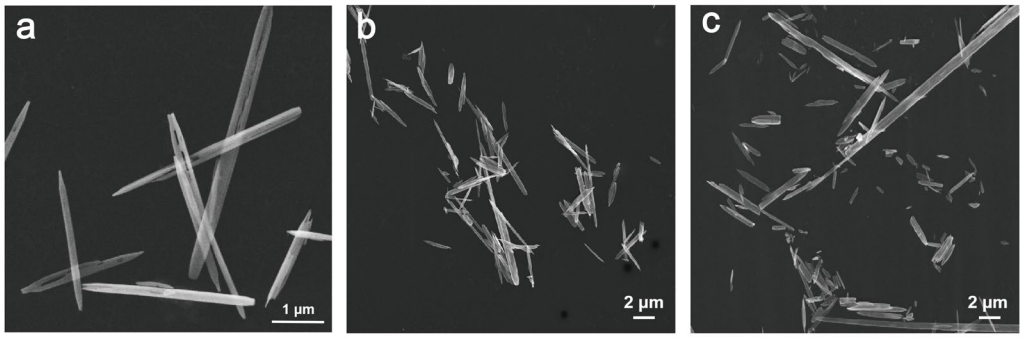

Figure S3. SEM images of Co/MoO_{3-x} (a), Co/MoO_{3-x} after the first photothermal cycle (b) and the second photothermal cycle (c).

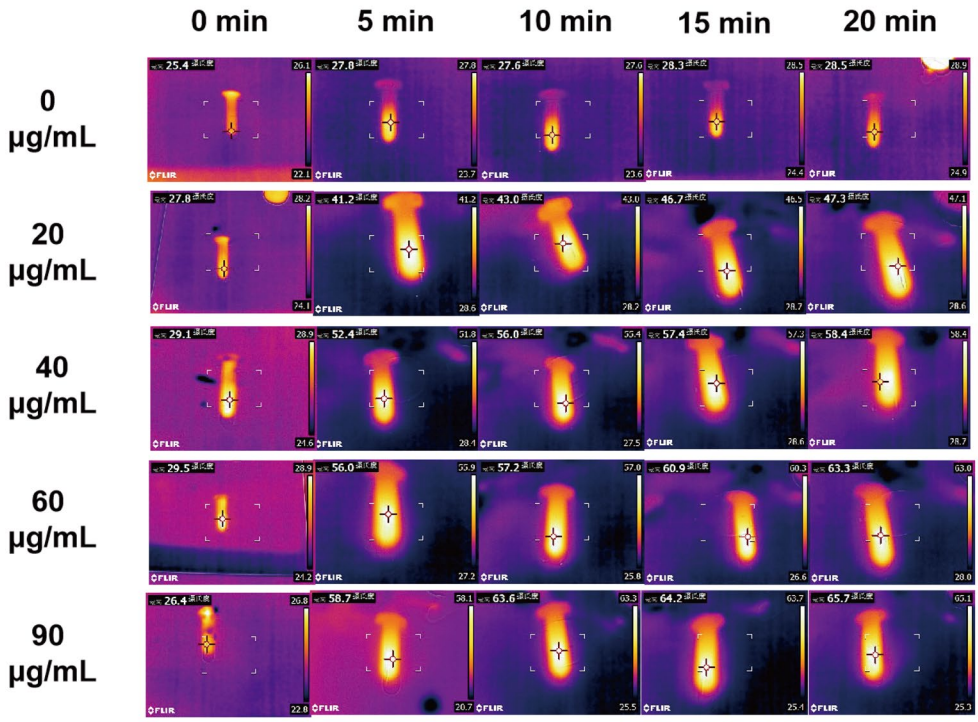

Figure S4. A picture of the heating process recorded by the thermal imaging camera.

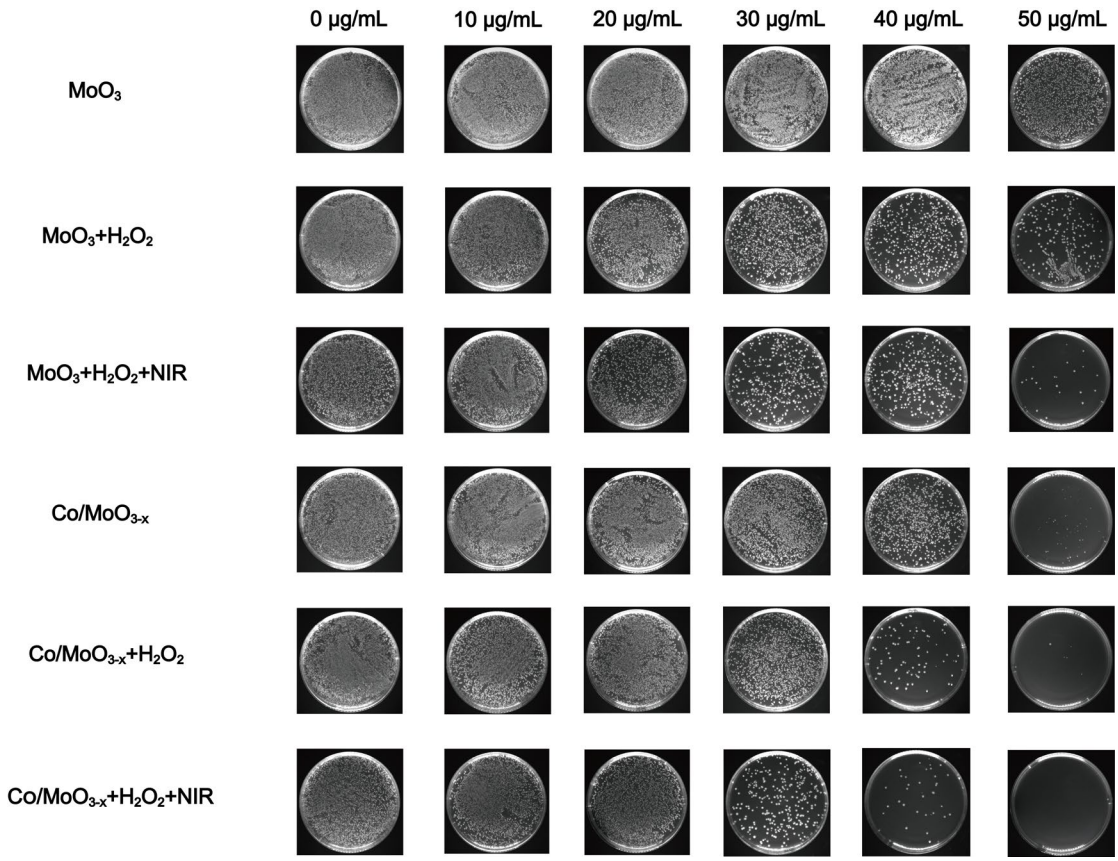

Figure S5. Representative plate photographs of the different samples for ESBL-*E. coli* on the LB agar plate.

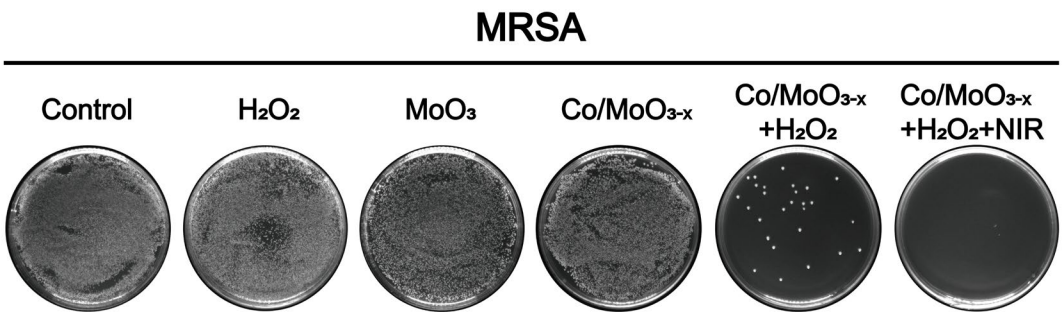

Figure S6. Representative plate photographs of the different samples for *Staphylococcus aureus* on the LB agar plate.

Table S1. Comparison of POD-like activity of Co/MoO_{3-x} with other similar antibacterial nanomaterials.

Materials	Reaction time (min)	Reaction pH	Materials concentration
Cu^{+} -MoO_{3-x}[1]	10	4	25 μg/mL
PANI/MoO_{3-x}[2]	10	7.4, 6.5, or 5.4	100 μg/mL
MoO_{3-x}/CuS[3]	15	5	1 mg/mL
NH−MoO_{3-x}[4]	a certain reaction time	6.5	50 μg/mL
Co/MoO_{3-x}	10	4	50 μg/mL

Table S2. Comparison of photothermal effect of Co/MoO_{3-x} with other similar antibacterial nanomaterials.

Materials	Elevated temperature (℃)	photothermal conversion efficiency (η) (%)
Ir@Fe_3O_4 NPs[5]	23	Not given
PdMo[6]	23.2	45.4
RhRe NP[7]	31.2	43.5
ND nanozymes[8]	23.4	43.8
Co/MoO_{3-x}	35	12.95

References

1. X. N. Wang, M. Y. Cao, X. H. Zhu, J. P. Yu, Y. T. Liu, A. H. Li and Y. H. Xu. Electron Reservoir MoO_{3-x}-Driven Cu Doped Nanozyme with Enhanced Antibacterial Activity via Disrupting Redox Homeostasis. *Chin. J. Chem.* **2024**, *42* (18), 2187-2196.
2. T. T. Hu, B. L. Xue, F. Q. Meng, L. Ma, Y. H. Du, S. L. Yu, R. Q. Ye, H. Li, Q. H. Zhang, L. Gu, Z. Zhou, R. Z. Liang and C. L. Tan. Preparation of 2D Polyaniline/MoO_{3-x} Superlattice Nanosheets via Intercalation-Induced Morphological Transformation for Efficient Chemodynamic Therapy. *Adv. Healthc. Mater.* **2023**, *12* (11), 2202911.
3. Y. Chen, J. Zhang, Y. Li, G. K. Li and Y. L. Hu. Bifunctional MoO_{3-x}/CuS Heterojunction Nanozyme-Driven "Turn-On" SERS Signal for the Sensitive Detection of Cerebral Infarction Biomarker S100B. *Anal. Chem.* **2024**, *96* (44), 17711-17719.
4. Z. Zhou, Y. Wang, F. Peng, F. Meng, J. Zha, L. Ma, Y. Du, N. Peng, L. Ma, Q. Zhang, L. Gu, W. Yin, Z. Gu and C. Tan. Intercalation-Activated Layered MoO_3 Nanobelts as Biodegradable Nanozymes for Tumor-Specific Photo-Enhanced Catalytic Therapy. *Angew. Chem. Int. Edit.* **2022**, *61* (16), e202115939.
5. K. Q. Qiu, J. Q. Wang, T. W. Rees, L. N. A. Ji, Q. L. Zhang and H. Chao. A mitochondria-targeting photothermogenic nanozyme for MRI-guided mild photothermal therapy. *Chem. Commun.* **2018**, *54* (100), 14108-14111.
6. W. Zhou, N. Li, M. H. Wang, P. X. Wu, Q. Fu, W. J. Wang, Z. Liu, S. Y. He, M. Y. Zhou, D. Song, J. Chen, N. Y. Lin, Y. Y. Wu, L. Jiao, X. F. Tan and Q. L. Yang. PdMo bimetallene nanozymes for photothermally enhanced antibacterial therapy and accelerated wound healing. *Dalton T.* **2024**, *53* (2), 666-674.
7. H. N. Ma, C. X. Lu, Z. Y. Jin, R. Liu, Z. H. Miao, Z. B. Zha and Z. C. Tao. Rhodium-Rhenium Alloy Nanozymes for Non-inflammatory Photothermal Therapy. *ACS Appl. Mater. Interfaces.* **2024**, *16* (17), 21653-21664.
8. X. W. Wang, L. X. Fan, L. Cheng, Y. B. Sun, X. Y. Wang, X. Y. Zhong, Q. Q. Shi, F. Gong, Y. Yang, Y. Ma, Z. H. Miao and Z. B. Zha. Biodegradable Nickel Disulfide Nanozymes with GSH-Depleting Function for High-Efficiency Photothermal-Catalytic Antibacterial Therapy. *Iscience.* **2020**, *23* (7), 101281.